

**Time & Motion Study**

Organization:

Trip- 2 Date: 23rd May 1997

Vehicle No. KUL 992

Loading Capacity: 7 TON

Researcher's name:

No. of Crew: 11

Estimated Volume: 5.6m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min)	Loading time (min.)	Remarks (route)
Start from workshop	out	220,121		11 : 50			Enterprise road
Loading-1	in	220,130	9,000	12 : 40	50		
	out			13 : 9		29	
							To Dumping site through Enterprise road
							Lusaka road-Jogoo road
							Outering road-Mutarakwa
Dumping site	in	220,146	16,000	13 : 39	30		
Start dumping				13 : 45	6		Dandora
Finish dumping				14 : 17		32	
Dumping site	out	220,148	2,000	14 : 22	5		
Reach to workshop	in	220,158	10,000	14 : 52	30		
Total			37,000		121	61	Total min.: 182 min.
Collection			0		0	29	
Transportation			35,000		110		
Inside the dumping site			2,000		11	32	Dumping time
Idling time							

# Time & Motion Study

Organization: N.C.C

Trip- 1 Date: 23rd May 1997

Vehicle No. KUL 993

Loading Capacity: 6.22 TON Researcher's name: D. Akinyi

No. of Crew: 10

Estimated Volume: 4.5m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	178,182.0		9 : 30			workshop to garage
Loading-1	in	178,187.9	5,900	9 : 49	19		Komarock infill Estate
	out						
Loading-2	in	178,189.5	1,600	10 : 27	38		Komarock 3B
	out			10 : 40		13	
Loading-3	in	178,205.1	15,600	11 : 21	41		Komarock 3A
	out						
Loading-4	in	178,227.6	22,500	12 : 30	69		
	out	178,228.0	400	13 : 0		30	
Loading-5	in	178,228.5	500	13 : 6	6		
	out	178,229.0	500	13 : 40		34	
Loading-6	in	178,229.5	500	13 : 45	5		
	out	178,230.3	800	14 : 40		55	
Dumping site	in	178,241.2	10,900	15 : 15	35		
Start dumping		178,241.3	100	15 : 17	2		Dumping site to Kaloleni
Finish dumping		178,241.5	200	15 : 20		3	Deport
Dumping site	out	178,243.0	1,500	15 : 30	10		
Reach to workshop	in	178,260.0	17,000	17 : 0	90		
Total			78,000		315	135	Total min.: 450 min.
Collection			42,400		159	132	
Transportation			33,800		144		
Inside the dumping site			1,800		12	3	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C.

Trip-1 Date: 23rd May 1997

Vehicle No. KWE 081

Loading Capacity: 7.830 TON Researcher's name: B.Chizi

No. of Crew: 7

Estimated Volume: 7 m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	186,475		8 : 10			
Loading-1	in	186,492	17,000	10 : 57	167		
	out			11 : 10		13	
Loading-2	in	186,496	4,000	11 : 22	12		
	out			11 : 45		23	
Loading-3	in	186,502	6,000	11 : 58	13		Silver spring hotel
	out			12 : 0		2	
Loading-4	in	186,503	1,000	12 : 4	4		Kadara road
	out			12 : 10		6	Kadara estate
Loading-5	in	186,505	2,000	12 : 14	4		Gatundu road
	out			12 : 16		2	
Loading-6	in	186,506	1,000	12 : 18	2		Othaga road
	out			12 : 20		2	
Loading-7	in	186,508	2,000	12 : 23	3		Oloikitokok close on
	out			12 : 26		3	Githanga-Muthangari road
Loading-8	in	186,508	0	12 : 31	5		Mugumo road
	out			12 : 33		2	
Loading-9	in	186,510	2,000	12 : 34	1		Mugumo road
	out			12 : 35		1	
Loading-10	in	186,510	0	12 : 35	0		Mugumo road
	out			12 : 36		1	
Loading-11	in	186,511	1000	12 : 44	8		Mugumo road
	out			12 : 45		1	
Loading-12	in	186,512	1000	12 : 47	2		
	out			12 : 47		0	Vice presidents house
Loading-13	in	186,514	2000	12 : 52	5		Mzima springs road
	out			12 : 53		1	
Loading-14	in	186,515	1000	12 : 55	2		Githanju road close
	out			12 : 59		4	
Loading-15	in	186,517	2000	13 : 5	6		Lavington supermarket
	out			13 : 20		15	off James Gichuru road
Loading-16	in	186,518	1000	13 : 26	6		Mbazi road
	out			13 : 27		1	
Start from workshop	out	186,518	0	13 : 27			
Loading-17	in	186,519	1,000	13 : 29	2		
	out			13 : 33		4	Mbazi road-Hundred
Loading-18	in	186,519	0	13 : 34	1		Avenue
	out			13 : 37		3	Mbazi road-Hundred
Loading-19	in	186,519	0	13 : 38	1		Avenue
	out			13 : 40		2	Koroshho road-Githanga road
Loading-20	in	168,529	10,000	14 : 13	33		
	out			14 : 33		20	
Dumping site	in	186,565	36,000	15 : 35	62		To dumping site through
Start dumping				15 : 45	10		Arwing-Kodhek road
Finish dumping				15 : 50		5	Valley road-Mbagathi road-
Dumping site	out	186,566	500	15 : 55	5		Langata road-Lusaka road
Reach to workshop	in	186,569	4,000	16 : 20	25		
Total			94,500		379	111	Total min.: 490 min.

**Time & Motion Study**

Organization: N.C.C.

Trip- 1

Date: 23rd May 1997

Vehicle No. KWE 081

Loading Capacity: 7.830 TON

Researcher's name: B.Chizi

No. of Crew: 7

Estimated Volume: 7 m<sup>3</sup>

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Collection		54,000		277	106	
Transportation		40,000		87		
Inside the dumping site		500		15	5	Dumping time
Idling time						

**Time & Motion Study**

Organization: N.C.C

Trip- 1 Date: 23rd May 1997

Vehicle No. KWE 084

Loading Capacity: 7.98 TON Researcher's name: A. A. Nassir

No. of Crew: 8

Estimated Volume: 6m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	99,844.7		7 : 54			Kaloleni to Garage
Loading-1	in	99,886.0	41,300	11 : 8	194		Ngong road-Kodhek road
	out			11 : 9			1 Valley road-Kenyatta road-
Loading-2	in	99,888.0	2,000	11 : 13	4		Nyerere Avenue-Manilaka road
	out			11 : 15			2 State house road-Denis sprit
Loading-3	in	99,889.0	1,000	11 : 16	1		Woodland road
	out			11 : 24		8	
Loading-4	in	99,893.0	4,000	11 : 34	10		To dumping site
	out			11 : 56		22	
Loading-5	in	99,893.6	600	11 : 58	2		
	out			12 : 8		10	
Loading-6	in	99,893.8	200	12 : 10	2		
	out			12 : 12		2	
Loading-7	in	99,898.0	4,200	12 : 24	12		
	out			12 : 28		4	
Loading-8	in	99,898.8	800	12 : 32	4		
	out			13 : 18		46	
Loading-9	in	99,901.0	2,200	13 : 29	11		
	out			14 : 27		58	
Dumping site	in	99,925.0	24,000	16 : 2	95		
Start dumping		99,926.0	1,000	16 : 6	4		
Finish dumping				16 : 35		29	
Dumping site	out	99,927.0	1,000	16 : 40	5		
Reach to workshop	in	99,939.0	12,000	17 : 15	35		
Total			94,300		379	182	Total min.: 561 min.
Collection			15,000		46	153	
Transportation			77,300		324		
Inside the dumping site			2,000		9	29	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 1 Date: 23rd May 1997

Vehicle No. KWE 245

Loading Capacity: 7.83 TON Researcher's name: J. Masaba

No. of Crew: 7

Estimated Volume: 10 m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	161,934		9 : 36			
Loading-1	in	161,937	3,600	10 : 27	51		Parklands-General Mathenge
	out			10 : 28			1 grove
Loading-2	in	161,940	2,900	10 : 29	1		To dumping
	out			10 : 30			1 through parklands road
Loading-3	in	161,941	700	10 : 41	11		Outering-Komarock
	out			10 : 47		6	
Loading-4	in	161,942	1,100	10 : 50	3		
	out	161,942	300	10 : 55		5	
Loading-5	in	161,942	100	11 : 2	7		
	out			11 : 10		8	
Loading-6	in	161,943	800	11 : 17	7		
	out			11 : 22		5	
Loading-7	in	161,943	300	11 : 25	3		
	out			11 : 28		3	
Loading-8	in	161,944	500	11 : 30	2		
	out			11 : 34		4	
Loading-9	in	161,945	700	11 : 37	3		
	out			11 : 42		5	
Loading-10	in	161,946	1100	11 : 50	8		
	out			11 : 53		3	
Loading-11	in	161,947	1600	12 : 0	7		
	out			12 : 16		16	
Loading-12	in	161,948	400	12 : 20	4		
	out			12 : 22		2	
Loading-13	in	161,948	700	12 : 24	2		
	out			12 : 28		4	
Loading-14	in	161,949	700	12 : 30	2		
	out			12 : 44		14	
Dumping site	in	161,967	18,000	13 : 20	36		
Start dumping							
Finish dumping						0	
Dumping site	out	161,968	400	13 : 30	10		
Reach to workshop	in						
Total			33,900		157	77	Total min.: 234 min.
Collection			11,900		60	77	
Transportation			21,600		87		
Inside the dumping site			400		10	0	Dumping time
Idling time							Fuel

**Time & Motion Study**

Organization: N.C.C

Trip- I Date: 24th May 1997

Vehicle No. KAB 389Q

Loading Capacity: 12 TON

Researcher's name: C.Njoroge

No. of Crew: 1

Estimated Volume: 4.5m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,543		8 : 16			Jogoo road to Lagos Deport
Loading-1	in	9,547	4,000	8 : 41	25		Accra road-River road
	out			8 : 43		2	Tom Mboya street
							To Dumping site through
							Muranga road-Thika road
							Outering road-Komarock
							dandora
Dumping site	in	9,560	13,000	9 : 5	22		
Start dumping		9,562	2,000	9 : 10	5		
Finish dumping				9 : 11		1	
Dumping site	out	9,563	1,000	9 : 16	5		
Reach to workshop	in						
<b>Total</b>			20,000		57	3	Total min.: 60 min.
Collection			0		0	2	
Transportation			17,000		47		
Inside the dumping site			3,000		10	1	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 2 Date: 24th May 1997

Vehicle No. KAB 389Q

Loading Capacity: 12 TON

Researcher's name: C. Njoroge

No. of Crew: 1

Estimated Volume: 4.5m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,563		9 : 16			From Dandora
Loading-1	in	9,605	13,000	10 : 6	50		River road
	out			10 : 7		1	
							To dumping site through
							Tom Mboya -Muranga road
							thiak road-Outering-komarock
							road to dandora
Dumping site	in	9,589	13,000	11 : 12	65		
Start dumping		9,591	2,000	11 : 16	4		
Finish dumping				11 : 17		1	
Dumping site	out	9,593	2,000	11 : 21	4		
Reach to workshop	in						
Total			30,000		123	2	Total min.: 125 min.
Collection			0		0	1	
Transportation			26,000		115		
Inside the dumping site			4,000		8	1	Dumping time
Idling time							



**Time & Motion Study**

Organization: N.C.C

Trip- 3 Date: 24th May 1997

Vehicle No. KAB 389Q

Loading Capacity: 12 TON

Researcher's name: C.Njoroge

No. of Crew: 1

Estimated Volume: 4.5m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,593		9 : 16			
Loading-1	in	9,605	12,000	11 : 51	155		Accra road - river road
	out			11 : 53		2	
							To Dumping site through
							Tom Mboya street Muranga
							road Thika road-Outering road
							komarock road
Dumping site	in	9,621	16,000	12 : 30	37		
Start dumping		9,622	1,000	12 : 35	5		
Finish dumping				12 : 36		1	
Dumping site	out	9,623	1,000	12 : 40	4		
Reach to workshop	in						
Total			30,000		201	3	Total min.: 204 min.
Collection			0		0	2	
Transportation			28,000		192		
Inside the dumping site			2,000		9	1	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 4 Date: 24th May 1997

Vehicle No. KAB 389Q

Loading Capacity: 12 TON

Researcher's name: C.Njoroge

No. of Crew: 1

Estimated Volume: 4.5m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,623		12 : 40			
Loading-1	in	9,634	11,000	13 : 2	22		Race course road-Ring road
	out			13 : 3		1	Pumwani--
							To Dumping site via
							Race Course road-Muranga
							rod Thika road-Outering road
							Komarock
Dumping site	in	9,646	12,000	13 : 27	24		
Start dumping		9,647	1,000	13 : 32	5		
Finish dumping				13 : 33		1	
Dumping site	out	9,650	3,000	13 : 36	3		
Reach to workshop	in						
Total			27,000		54	2	Total min.: 56 min.
Collection			0		0	1	
Transportation			23,000		46		
Inside the dumping site			4,000		8	1	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 5 Date: 24th May 1997

Vehicle No. KAB 389Q

Loading Capacity: 12 TON

Researcher's name: C.Njoroge

No. of Crew: 1

Estimated Volume: 4.5m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,650		13 : 36			
Loading-1	in	9,661	11,000	14 : 12	36		Race course road
	out			14 : 15		3	
							To Dumping site
							via Race course
							Muranga road-Thika road-
							Outering road-komarock road
Dumping site	in	9,674	13,000	14 : 40	25		
Start dumping		9,675	1,000	14 : 45	5		
Finish dumping				14 : 46		1	
Dumping site	out	9,677	2,000	14 : 50	4		
Reach to workshop	in	9,698	21,000	15 : 45	55		
Total			48,000		125	4	Total min.: 129 min.
Collection			0		0	3	
Transportation			45,000		116		
Inside the dumping site			3,000		9	1	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip-1 Date: 24th May 1997

Vehicle No. KAB 880

Loading Capacity: 7 TON

Researcher's name: Arafa

No. of Crew: 2

Estimated Volume: 6m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	12,309		8 : 15			
Loading-1	in	12,314	5,000	8 : 40	25		Jogoo-Lusaka-Enterprise
	out			8 : 45		5	Ladhies-Haileselesie road
							Moi-Tom Mboya street
							To Dumping site through
							Accra-River road-Tom Mboya
							Muranga road-Thika road
							Outering road-Komarock
Dumping site	in	12,327	13,000	9 : 7	22		
Start dumping							
Finish dumping						0	
Dumping site	out	12,330	3,000	9 : 20	13		
Reach to workshop	in						
<b>Total</b>			21,000		60	5	Total min.: 65 min.
Collection			0		0	5	
Transportation			18,000		47		
Inside the dumping site			3,000		13	0	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip-2 Date: 24th May 1997

Vehicle No. KAB 880

Loading Capacity: 7 TON

Researcher's name: Arafa

No. of Crew: 2

Estimated Volume: 6m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	12,330		9 : 20			
Loading-1	in	12,343	13,000	9 : 53	33		Komorock road-Outering road
	out			10 : 0		7	Thika road-Muranga road
							Tom Mboya road-Accra
							To dumping site through
							River road-Ladhies road
							Mumias-Muranga road-
							Komorock road
Dumping site	in	12,356	13,000	10 : 35	35		
Start dumping							
Finish dumping						0	
Dumping site	out	12,359	3,000	10 : 50	15		
Reach to workshop	in						
Total			29,000		83	7	Total min.: 90 min.
Collection			0		0	7	
Transportation			26,000		68		
Inside the dumping site			3,000		15	0	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip-3 Date: 24th May 1997

Vehicle No. KAB 880

Loading Capacity: 7 TON

Researcher's name: Arafa

No. of Crew: 2

Estimated Volume: 6m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	12,359		10 : 50			
Loading-1	in	12,373	14,000	11 : 35	45		Komarock road-Mutarakwa road
	out			11 : 44		9	Mumias road-Rabai road-Ladhis road-River road-Ngara road
							Tom Mboya to Accra
							To dumping site through
							Accra road-River road-Tom
							Mboya Muranga road-Thika road
							Outering-Komarock todandora
Dumping site	in	12,386	13,000	12 : 20	36		
Start dumping							
Finish dumping						0	
Dumping site	out	12,390	4,000	12 : 35	15		
Reach to workshop	in	12,404	14,000	13 : 20	45		
Total			45,000		141	9	Total min.: 150 min.
Collection			0		0	9	
Transportation			41,000		126		
Inside the dumping site			4,000		15	0	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 1 Date: 24th May 1997

Vehicle No. KUL 911

Loading Capacity: 7 TON

Researcher's name: C. Dzuya

No. of Crew: 5

Estimated Volume: 3m<sup>3</sup>

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out		8 : 20			To NCC depot
Loading-1	in		9 : 8	48		Kenyatta Avenue-Kimathi street
	out		12 : 0		172	Mama Ngina to Munyiri Chips
						To Dumping site
						through Tom Mboya
						Muranga-Thika-Outering
						Komarock and back through the same route
Dumping site	in		12 : 40	40		
Start dumping			12 : 47	7		
Finish dumping			13 : 37		50	
Dumping site	out		13 : 46	9		
Reach to workshop	in		14 : 30	44		
Total		0		148	222	Total min.: 370 min.
Collection		0		0	172	
Transportation		0		132		
Inside the dumping site		0		16	50	Dumping time
Idling time						

**Time & Motion Study**

Organization: N.C.C

Trip- 1 Date: 24th May 1997

Vehicle No. KUL 976

Loading Capacity: 4.2 TON

Researcher's name: F. Mwatua

No. of Crew: 6

Estimated Volume: 5m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			8 : 37			Kaloleni to Jogoo road
Loading-1	in		12,000	9 : 26	49		Likoni road-Lunga Lunga road
	out		0	12 : 5		159	Enterprise road-Mombasa road-Airport road
							To dumping via Airport road
							Outering road-Komarock road
							Dandora
Dumping site	in		15,000	13 : 15	70		
Start dumping			200	13 : 20	5		
Finish dumping			0	13 : 22		2	
Dumping site	out		200	13 : 27	5		
Reach to workshop	in		13,000	14 : 43	76		
Total			40,400		205	161	Total min.: 366 min.
Collection			0		0	159	
Transportation			40,000		195		
Inside the dumping site			400		10	2	Dumping time
Idling time							



**Time & Motion Study**

Organization: N.C.C

Trip- 1 Date: 24th May 1997

Vehicle No. KUL 989

Loading Capacity: 7 TON

Researcher's name: G.N. Kamau

No. of Crew: 7

Estimated Volume: 6.75m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	178,230		8 : 15			
Loading-1	in	178,234	4,000	8 : 47	32		Accra road
	out			8 : 54		7	
Loading-2	in	178,235	1,000	8 : 57	3		Banda street
	out			9 : 7		10	
Loading-3	in	178,236	1,000	9 : 10	3		Tubman road
	out			9 : 50		40	
Loading-4	in	178,237	700	9 : 54	4		Kaunda road
	out			11 : 9		75	
							To dumping site through Muindi
							Mbingu street-Kenyatta Avenue
							Mondlane-Tom Mboya street
							Muranga road-Thika road
							Outering road to Dandora
							back through same route
Dumping site	in	178,253	16,300	12 : 25	76		
Start dumping				12 : 27	2		
Finish dumping				13 : 11		44	
Dumping site	out	178,256	3,000	13 : 26	15		
Reach to workshop	in	178,276	20,000	14 : 40	74		
Total			46,000		209	176	Total min.: 385 min.
Collection			2,700		10	132	
Transportation			40,300		182		
Inside the dumping site			3,000		17	44	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 1 Date: 24th May 1997

Vehicle No. KUL 990

Loading Capacity: 7.83 TON

Researcher's name: B. Chizi

No. of Crew: 5

Estimated Volume: 7m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	202,493.0		7 : 36			Kaloleni to Ngara Deport fer
Loading-1	in	202,496.0	3,000	8 : 11	35		Allocation Kinjeku road
	out			8 : 11		0	
Loading-2	in	202,496.0	0	8 : 22	11		Limuru road
	out			8 : 58		36	
Loading-3	in	202,498.0	2,000	9 : 3	5		Highridge shopping center
	out			9 : 9		6	
Loading-4	in	202,503.0	5,000	9 : 48	39		Masari road toparklands road
	out			10 : 48		60	
							To Dumping through parklands-Forest road-Thika road
							Outering road-Komareck road to Dandora
Dumping site	in	202,519.0	16,000	12 : 12	84		
Start dumping				12 : 18	6		
Finish dumping				12 : 44		26	
Dumping site	out	202,519.5	500	12 : 49	5		
Reach to workshop	in			:			
<b>Total</b>			<b>26,500</b>		<b>185</b>	<b>128</b>	<b>Total min.: 313 min.</b>
Collection			<b>7,000</b>		<b>55</b>	<b>102</b>	
Transportation			<b>19,000</b>		<b>119</b>		
Inside the dumping site			<b>500</b>		<b>11</b>	<b>26</b>	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 2 Date: 24th May 1997

Vehicle No. KUL 990

Loading Capacity: 7.83 TON

Researcher's name: B. Chizi

No. of Crew: 5

Estimated Volume: 7m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	202,519.5		12 : 49			Dumping site
Loading-1	in	202,545.0	25,500	13 : 47	58		Junction to UNEP near K.T.T.C
	out			14 : 10		23	and UNEP offices
Loading-2	in	202,548.0	3,000	14 : 15	5		
	out			15 : 5		50	
							To dumping through Limuru road-Forest road-Muranga road
							Thika road-Outering road
							Komarock road
Dumping site	in	202,569.0	21,000	16 : 20	75		
Start dumping				16 : 25	5		
Finish dumping				16 : 46		21	
Dumping site	out		500	16 : 48	2		
Reach to workshop	in			:			
Total			50,000		145	94	Total min.: 239 min.
Collection			3,000		5	73	
Transportation			46,500		133		
Inside the dumping site			500		7	21	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 1 Date: 24th May 1997

Vehicle No. KUL 993

Loading Capacity: 7.98 TON

Researcher's name: Ali A. Nassir

No. of Crew: 5

Estimated Volume: 5m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	78,304		8 : 7			Kaloleni to Umoja Deport
Loading-1	in	78,319	15,000	8 : 56	49		Kayole Estate
	out			9 : 0		4	
Loading-2	in	78,319	200	9 : 1	1		Komarock Estate
	out			9 : 15		14	
Loading-3	in	78,320	300	9 : 18	3		To Dumping site at Dandor
	out			9 : 37		19	
Loading-4	in	78,320	500	9 : 40	3		
	out			9 : 54		14	
Loading-5	in	78,321	1,000	10 : 8	14		
	out			10 : 34			
Dumping site	in	78,330	9,000	10 : 52	44		
Start dumping		78,331	1,000	10 : 58	0		
Finish dumping							
Dumping site	out	78,332	1,000	11 : 31	39		
Reach to workshop	in						
Total			28,000		153	51	Total min.: 204 min.
Collection			2,000		21	51	
Transportation			24,000		93		
Inside the dumping site			2,000		12	0	Dumping time
Idling time					27		Break down

**Time & Motion Study**

Organization: N.C.C

Trip- 2 Date: 24th May 1997

Vehicle No. KUL 993

Loading Capacity: 7.98 TON

Researcher's name: Ali A. Nassir

No. of Crew: 5

Estimated Volume: 5m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	78,332.0		11 : 31			Dandora
Loading-1	in	78,342.0	10,000	11 : 50	19		Komarock Estate via Komarock
	out			11 : 57		7	road-Mutarakwa road-Outering
Loading-2	in	78,342.2	200	12 : 1	4		road to Kayolel Komorok
	out			12 : 4		3	
Loading-3	in	78,342.4	200	12 : 6	2		To Dandora via Kayole-Komaroc
	out						Outering road-Mutarakwa road
Loading-4	in	78,343.5	1,100	12 : 10	4		Komarock road
	out			12 : 32		22	
Loading-5	in	78,343.6	100	12 : 33	1		
	out			12 : 40		7	
Loading-6	in	78,343.8	200	12 : 41	1		
	out			12 : 55		14	
Loading-7	in	78,344.1	300	12 : 58	3		
	out			13 : 5		7	
Dumping site	in	78,354.2	10,100	13 : 28	23		
Start dumping				13 : 32	4		
Finish dumping				13 : 35		3	
Dumping site	out	78,355.3	1,100	13 : 50	15		
Reach to workshop	in	78,373.5	18,200	15 : 11	81		Kaloleni
<b>Total</b>			<b>41,500</b>		<b>157</b>	<b>63</b>	<b>Total min.: 220 min.</b>
Collection			<b>2,100</b>		<b>15</b>	<b>60</b>	
Transportation			<b>38,300</b>		<b>123</b>		
Inside the dumping site			<b>1,100</b>		<b>19</b>	<b>3</b>	<b>Dumping time</b>
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 1 Date: 24th May 1997

Vehicle No. KWE 073

Loading Capacity: 7.88 TON

Researcher's name: J. Masaba

No. of Crew: 9

Estimated Volume: 10m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	153,882.6		8 : 50			
Loading-1	in	153,882.7	100	9 : 25	35		Njiwa road
	out			9 : 30		5	
Loading-2	in	153,882.8	100	9 : 35	5		To dumping site through
	out			9 : 45		10	Jogoo road-Komarock
Loading-3	in	153,882.9	100	9 : 46	1		to Dandora
	out			9 : 55		9	
Loading-4	in	153,883.0	100	10 : 0	5		8:55- 9:15 Milcage was not in
	out			10 : 50		50	function. Then went back to
Loading-5	in	153,883.1	100	10 : 55	5		Kaloleni
	out			11 : 20		25	
Loading-6	in	153,883.2	100	11 : 25	5		
	out			12 : 10		45	
Loading-7	in	153,883.3	100	12 : 50	40		
	out			13 : 0		10	
Dumping site	in			13 : 45	45		
Start dumping							
Finish dumping						0	
Dumping site	out			13 : 55	10		
Reach to workshop	in						
<b>Total</b>			700		151	154	Total min.: 305 min.
<b>Collection</b>			600		61	154	
<b>Transportation</b>			100		80		
<b>Inside the dumping site</b>			0		10	0	Dumping time
<b>Idling time</b>							

**Time & Motion Study**

Organization: N.C.C

Trip- 1 Date: 24th May 1997

Vehicle No. KWE 084

Loading Capacity: 7.8 TON

Researcher's name: E. kairu

No. of Crew: 11

Estimated Volume: 5.6m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	99,955.0		7 : 58			
Loading-1	in	99,986.0	31,000	9 : 50	112		Muringa road
	out			9 : 53		3	
Loading-2	in	99,987.0	1,000	9 : 55	2		Kirichwa road
	out			10 : 12		17	
Loading-3	in			10 : 17	5		Nabro apartments
	out			10 : 23		6	
Loading-4	in	99,988.0	1,000	10 : 25	2		Chania Avenue
	out			10 : 30		5	
Loading-5	in	99,992.0	4,000	10 : 37	7		Silver springs Hotel
	out			10 : 59		22	
Loading-6	in	99,997.0	5,000	11 : 10	11		Ring road Westlands
	out			11 : 11		1	
Loading-7	in			11 : 12	1		Rhapta road Apartinents
	out			11 : 14		2	
Loading-8	in			11 : 17	3		Continental Hotel-Rapta road
	out			11 : 29		12	
Loading-9	in			11 : 36	7		
	out			11 : 37		1	
Loading-10	in	99,998.0	1,000	11 : 39	2		David Osieli road
	out			11 : 41		2	
Loading-11	in		60	11 : 42	1		Rhapta road
	out			11 : 46		4	
Loading-12	in	99,998.0	30	11 : 46	0		
	out			11 : 47		1	
Loading-13	in	99,998.1	20	11 : 48	1		
	out			11 : 48		0	
Loading-14	in			11 : 49	1		
	out			11 : 50		1	
Loading-15	in			11 : 50	0		
	out			11 : 51		1	
Loading-16	in			11 : 53	2		
	out			11 : 55		2	
Loading-17	in	99,998.1	40	11 : 56	1		
	out			12 : 10		14	
Loading-18	in	99,998.1	30	12 : 11	1		
	out			12 : 12		1	Belle Vista Apartments
Loading-19	in	99,998.1	10	12 : 12	0		
	out			12 : 16		4	
Loading-20	in	99,998.2	30	12 : 16	0		Saint Marys School
	out			12 : 21		5	
Loading-21	in			12 : 24	3		Mkoko close
	out			12 : 26		2	
Loading-22	in	99,998.5	300	12 : 26	0		
	out			12 : 27		1	
Loading-23	in	99,998.7	200	12 : 30	3		Mimosa road
	out			12 : 31		1	
Loading-24	in	99,999.0	300	12 : 35	4		Mimosa road
	out			12 : 36		1	mvuli road new join

**Time & Motion Study**

Organization: N.C.C

Trip- 1 Date: 24th May 1997

Vehicle No. KWE 084

Loading Capacity: 7.8 TON

Researcher's name: E. kairu

No. of Crew: 11

Estimated Volume: 5.6m<sup>3</sup>

Location		Mileage (m)	Distance (m)	Time	Moving time (min)	Loading time (min.)	Remarks (route)
Loading-25	in			12 : 39	3		waki yoki way
	out			12 : 45		6	David Osieli road- waki yoki
Loading-26	in	100,002.0	3,000	12 : 46	1		
	out			12 : 52		6	
Loading-27	in			12 : 54	2		
	out			13 : 12		18	
Dumping site	in			15 : 3	111		
Start dumping							
Finish dumping							
Dumping site	out			15 : 22	19		
Reach to workshop	in						
<b>Total</b>			<b>47,020</b>		<b>305</b>	<b>139</b>	<b>Total min.: 444 min.</b>
<b>Collection</b>			<b>16,020</b>		<b>63</b>	<b>139</b>	
<b>Transportation</b>			<b>31,000</b>		<b>223</b>	<b>0</b>	
<b>Inside the dumping site</b>			<b>0</b>		<b>19</b>	<b>0</b>	<b>Dumping time</b>
<b>Idling time</b>							



**Time & Motion Study**

Organization: N.C.C

Trip- 1 Date: 25th May 1997

Vehicle No. KAB 389Q

Loading Capacity: 12 TON

Researcher's name: C. Njoroge

No. of Crew: 1

Estimated Volume: 6m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,688		8 : 18			
Loading-1	in	9,690	2,000	8 : 27	9		Racecourse-Ring road
	out			8 : 28		1	
							To dumping via Ring road-Ngara road -Muranga road--Thika road
							Outering road-Komarock
							Dandora
Dumping site	in	9,703	13,000	8 : 50	22		Dandora dumping site
Start dumping		9,704	1,000	8 : 54	4		
Finish dumping				8 : 55		1	
Dumping site	out	9,705	1,000	8 : 59	4		
Reach to workshop	in						
<b>Total</b>			17,000		39	2	Total min.: 41 min.
<b>Collection</b>			0		0	1	
<b>Transportation</b>			15,000		31		
<b>Inside the dumping site</b>			2,000		8	1	Dumping time
<b>Idling time</b>							

**Time & Motion Study**

Organization: N.C.C

Trip- 2 Date: 25th May 1997

Vehicle No. KAB 389Q

Loading Capacity: 12 TON

Researcher's name: C. Njoroje

No. of Crew: 1

Estimated Volume: 6m<sup>3</sup>

Location	Milcege (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	9,705		8 : 59			
Loading-1	9,718	3,000	9 : 25	26		From Dandora-Komorock road-
			9 : 28		3	Outering road-Thika road-Murang
						road-ring road pumwani-Hailselas
						Avenue-Race course-Ring road n
Dumping site	9,731	13,000	9 : 50	22		Muranga road
Start dumping	9,733	2,000	9 : 54	4		Thika road-Komorock road-
Finish dumping			9 : 55		1	Damadora road
Dumping site	9,734	1,000	9 : 59	4		
Reach to workshop						
Total		19,000		56	4	Total min.: 60 min.
Collection		0		0	3	
Transportation		16,000		48		
Inside the dumping site		3,000		8	1	Dumping time
Idling time						

### Time & Motion Study

Organization: N.C.C

Trip- 3 Date: 25th May 1997

Vehicle No. KAB 389Q

Loading Capacity: 12 TON

Researcher's name: C. Njoroge

No. of Crew: 1

Estimated Volume: 6.5m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,734		9 : 59			Dumping site
Loading-1	in	9,746	12,000	10 : 24	25		Pumwani road
	out			10 : 28		4	
							To dumping site through
							Ladhis road-Haileselasia-
							Ring road pumwani-Race course
							Ring road Ngara-Muranga road
							Thika road-Outering-Komarock road
Dumping site	in	9,759	13,000	10 : 52	24		
Start dumping		9,761	2,000	10 : 56	4		
Finish dumping				10 : 57		1	
Dumping site	out	9,762	1,000	11 : 0	3		
Reach to workshop	in						
Total			28,000		56	5	Total min.: 61 min.
Collection			0		0	4	
Transportation			25,000		49		
Inside the dumping site			3,000		7	1	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 4 Date: 25th May 1997

Vehicle No. KAB 389Q

Loading Capacity: 12 TON

Researcher's name: C. Njoroge

No. of Crew: 1

Estimated Volume: 6m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,762		11 : 0			Dandora Dumping site
Loading-1	in	9,775	13,000	11 : 32	32		Pumani road-Haileselasie
	out			11 : 33		1	Avenue
							To Dumping via Ring road
							Pumwani-Race course-Ring road
							Ngara-Muranga road-Thika road
							Outering road-Komarock
Dumping site	in	9,788	13,000	11 : 57	24		
Start dumping		9,790	2,000	12 : 2	5		
Finish dumping				12 : 3		1	
Dumping site	out	9,791	1,000	12 : 6	3		
Reach to workshop	in						
Total			29,000		64	2	Total min.: 66 min.
Collection			0		0	1	
Transportation			26,000		56		
Inside the dumping site			3,000		8	1	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 5 Date: 25th May 1997

Vehicle No. KAB 389Q

Loading Capacity: 12 TON

Researcher's name: C. Njoroge

No. of Crew: 1

Estimated Volume: 5.5m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,791		12 : 6			Dumping site
Loading-1	in	9,804	13,000	12 : 35	29		Pumwani road-Haileselesie
	out			12 : 38		3	Avenue
							To Dumping site
							via Race course
							Ring road Ngara-Muranga road
							Thika road-outering road
							Komarock road
Dumping site	in	9,817	13,000	13 : 0	22		
Start dumping		9,818	1,000	13 : 6	6		
Finish dumping							
Dumping site	out	9,820	2,000	13 : 10	4		
Reach to workshop	in						
Total			29,000		61	3	Total min.: 64 min.
Collection			0		0	3	
Transportation			26,000		51		
Inside the dumping site			3,000		10	0	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 6 Date: 25th May 1997

Vehicle No. KAB 389Q

Loading Capacity: 12 TON

Researcher's name: C. Njoroge

No. of Crew: 1

Estimated Volume: 5m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,820		13 : 10			Dumping site
Loading-1	in	9,834	14,000	13 : 45	35		Pumwani road-Haileselesie
	out			13 : 47		2	Avenue
							To dumping site through
							Race course road-Ring road
							Ngara-Muranga road-Thika road
							Outering road-Komarock road to Dandora
Dumping site	in	9,848	14,000	14 : 7	20		
Start dumping		9,849	1,000	14 : 12	5		
Finish dumping							
Dumping site	out	9,851	2,000	14 : 16	4		
Reach to workshop	in	9,863	12,000	15 : 0	44		
Total			43,000		108	2	Total min.: 110 min.
Collection			0		0	2	
Transportation			40,000		99		
Inside the dumping site			3,000		9	0	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 1

Date: 25th May 1997

Vehicle No. KAB 390Q

Loading Capacity: 6.95 TON

Researcher's name: E. Kainu

No. of Crew: 2

Estimated Volume: 8 m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	8,994.0		8 : 14			
Loading-1	in			8 : 20	6		
	out			8 : 27		7	Koinange street
							To Dumping site through
							Race course road-Haileselasia
							Ring road-Ngara-Muranga road
							Thiika road-Outering road
							Komarock road to Dandora
Dumping site	in	9,010.0	16,000	8 : 45	18		
Start dumping							
Finish dumping						0	
Dumping site	out	9,010.5	500	8 : 51	6		
Reach to workshop	in						
Total			16,500		30	7	Total min.: 37 min.
Collection			0		0	7	
Transportation			16,000		24		
Inside the dumping site			500		6	0	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 2 Date: 25th May 1997

Vehicle No. KAB 390Q

Loading Capacity: 6.95 TON

Researcher's name: E. Kainu

No. of Crew: 2

Estimated Volume: 8 m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Dumping Site	out	9,010.5		8 : 51			
Loading-1	in	9,024.0	13,500	9 : 13	22		Opposite Koinange street
	out			9 : 17		4	
							To Dumping through
							Race course road-Pumwani
							road-Jogoo road-BuruBuru
							Outering-Komarock to
							Dandora
Dumping site	in	9,038.0	14,000	9 : 40	23		
Start dumping							
Finish dumping						0	
Dumping site	out	9,038.5	500	9 : 45	5		
Reach to workshop	in						
Total			28,000		50	4	Total min.: 54 min.
Collection			0		0	4	
Transportation			27,500		45		
Inside the dumping site			500		5	0	Dumping time
Idling time							



**Time & Motion Study**

Organization: N.C.C

Trip- 3 Date: 25th May 1997

Vehicle No. KAB 390Q

Loading Capacity: 6.95 TON

Researcher's name: E. Kairu

No. of Crew: 2

Estimated Volume: 8 m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,038.5		9 : 45			Dumping site
Loading-1	in	9,051.0	12,500	10 : 8	23		Retail Market
	out			10 : 18		10	
							To Dumping site
Dumping site	in	9,067.0	16,000	10 : 37	19		
Start dumping							
Finish dumping						0	
Dumping site	out	9,067.5	500	10 : 44	7		
Reach to workshop	in						
Total			29,000		49	10	Total min.: 59 min.
Collection			0		0	10	
Transportation			28,500		42		
Inside the dumping site			500		7	0	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 4 Date: 25th May 1997

Vehicle No. KAB 390Q

Loading Capacity: 6.95 TON

Researcher's name: E. Kairu

No. of Crew: 2

Estimated Volume: 8 m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,067.5		10 : 44			Dumping site
Loading-1	in	9,081.0	13,500	11 : 7	23		wakulima Market
	out			11 : 15		8	
							To Dumping site
							through same
							route as above
Dumping site	in	9,096.0	15,000	11 : 34	19		
Start dumping							
Finish dumping						0	
Dumping site	out	9,096.5		11 : 50	16		
Reach to workshop	in						
Total			28,500		58	8	Total min.: 66 min.
Collection			0		0	8	
Transportation			28,500		42		
Inside the dumping site			0		16	0	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 5

Date: 25th May 1997

Vehicle No. KAB 390Q

Loading Capacity: 6.95 TON

Researcher's name: E. Kairu

No. of Crew: 2

Estimated Volume: 8 m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,096		11 : 50			
Loading-1	in	9,081		12 : 6	16		Wakulima Market
	out			12 : 11		5	
							To Dumping site through same route as above
Dumping site	in			12 : 32	21		
Start dumping							
Finish dumping						0	
Dumping site	out			12 : 38	6		
Reach to workshop	in						
Total			0		43	5	Total min.: 48 min.
Collection			0		0	5	
Transportation			0		37		
Inside the dumping site			0		6	0	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 1 Date: 25th May 1997

Vehicle No. KUI. 991

Loading Capacity: 7 TON

Researcher's name: F.N. Mwatua

No. of Crew: 6

Estimated Volume: 6m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	155,912		8 : 30			
Loading-1	in	155,930	18,000	9 : 43	73		Utalii College
	out			11 : 35		112	
Loading-2	in	155,933	3,000	11 : 45	10		Utalii College
	out			11 : 48		3	
							To Dumping site through
							Thika road-Horuma to
							Dandora
							Dandora -Komarock road-
							Outering road-Juja road
							to workshop(Kaloleni
Dumping site	in	155,943	10,000	12 : 40	52		
Start dumping		155,944	1,000	12 : 46	6		
Finish dumping				13 : 0		14	
Dumping site	out	155,945	1,000	13 : 7	7		
Reach to workshop	in	155,957	12,000	13 : 56	49		
Total			45,000		197	129	Total min.: 326 min.
Collection			3,000		10	115	
Transportation			40,000		174		
Inside the dumping site			2,000		13	14	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 1 Date: 25th May 1997

Vehicle KWE 084

Loading Capacity: 7.83 TON

Researcher's name: A. W. Mbongo

No. of Crew: 7

Estimated Volume: 7 m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	100,060.7		7 : 52			
Loading-1	in	100,083.5	22,800	8 : 47	55		Silver spring Hotel
	out			9 : 8		21	
Loading-2	in	100,086.1	2,600	9 : 16	8		Hurlingham -Ring road
	out			9 : 25		9	
Loading-3	in	100,086.9	800	9 : 32	7		
	out			9 : 34		2	
Loading-4	in	100,087.8	900	9 : 42	8		Kirichwa road
	out			9 : 57		15	
Loading-5	in	100,088.0	200	10 : 0	3		Kirichwa gardens
	out			10 : 25		25	
Loading-6	in	100,090.4	2,400	10 : 35	10		Arwings Khodek road
	out			10 : 49		14	
Loading-7	in	100,092.3	1,900	10 : 55	6		Elgon court-Ngong road
	out			11 : 11		16	
Loading-8	in	100,092.6	300	11 : 13	2		Ngong Avenue
	out			11 : 21		8	
Loading-9	in	100,092.7	100	11 : 22	1		Ngong Avenue
	out			11 : 26		4	
Loading-10	in	100,093.2	500	11 : 30	4		Ngong Avenue
	out			11 : 36		6	
Loading-11	in	100,093.5	300	11 : 39	3		Ngong Avenue
	out			11 : 54		15	
Loading-12	in	100,093.6	100	12 : 0	6		Ngong Avenue
	out			12 : 7		7	
Loading-13	in	100,094.8	1200	12 : 16	9		
	out			12 : 48		32	Nairobi Club
Loading-14	in	100,095.5	700	12 : 55	7		
	out			13 : 45		50	
Loading-15	in	100,097.6	2100	13 : 57	12		Milimani road
	out			14 : 15		18	
Loading-16	in	100,098.1	500	14 : 18	3		salama Hotel
	out			14 : 24		6	
Loading-17	in	100,100.0	1,900	14 : 58	34		Ngong road
	out			15 : 10		12	
Dumping site	in	100,128.8	28,800	15 : 59	49		
Start dumping		100,130.5	1,700	16 : 6	7		
Finish dumping				16 : 8		2	
Dumping site	out	100,132.0	1,500	16 : 16	8		
Reach to workshop	in	100,152.0	20,000	16 : 30	14		
Total			91,300		256	262	Total min.: 518 min.
Collection			16,500		123	260	
Transportation			71,600		118		
Inside the dumping site			3,200		15	2	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 1 Date: 26th may 1997

Vehicle No. KWE 081

Loading Capacity: 8 TON

Researcher's name: G. T. Atieno

No. of Crew: 6

Estimated Volume: 7 m<sup>3</sup>

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out		8 : 6			Kaloleni workshop to garage
Loading-1	in		8 : 20	14		Kilimani Estate
	out		11 : 33		193	
Loading-2	in		11 : 59	26		Mitui court
	out		12 : 11		12	
Loading-3	in		12 : 39	28		Maple cort
	out		12 : 41		2	
Loading-4	in		12 : 42	1		
	out		12 : 45		3	Vehicle Broke down and
Loading-5	in	400	12 : 46	1		could not proceed to Dumping
	out		12 : 47		1	site
Loading-6	in		12 : 55	8		Dagoretti Depot (Car broke do
	out					
Dumping site	in			0		
Start dumping				0		
Finish dumping					0	
Dumping site	out			0		
Reach to workshop	in		14 : 15	80		
Total		400		158	211	Total min.: 369 min.
Collection		400		56	211	
Transportation		0		102		
Inside the dumping site		0		0	0	Dumping time
Idling time						

**Time & Motion Study**

Organization: N.C.C

Trip- 1

Date: 26th May 1997

Vehicle No. KAB 389Q

Loading Capacity: 6.95 TON

Researcher's name: A.W. Mbogo

No. of Crew: 1

Estimated Volume: 3 m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,862.2		8 : 16			
Loading-1	in	9,874.7	12,500	9 : 51	95		Huruma corner
	out			9 : 53		2	
							To dumping site
Dumping site	in	9,878.0	3,300	10 : 3	10		
Start dumping		9,879.7	1,700	10 : 7	4		
Finish dumping				10 : 8		1	
Dumping site	out	9,881.0	1,300	10 : 12	4		
Reach to workshop	in						
<b>Total</b>			18,800		113	3	Total min.: 116 min.
Collection			0		0	2	
Transportation			15,800		105		
Inside the dumping site			3,000		8	1	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 2 Date: 26th May 1997

Vehicle No. KAB 389Q

Loading Capacity: 6.95 TON

Researcher's name: A.W. Mbogo

No. of Crew: 1

Estimated Volume: 3 m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,881.0		10 : 12			Dumping site
Loading-1	in	9,884.2	3,200	10 : 23	11		Huruma corner
	out			10 : 27		4	
							To dumping site
Dumping site	in	9,887.5	3,300	10 : 37	10		
Start dumping		9,889.2	1,700	10 : 41	4		
Finish dumping				10 : 42		1	
Dumping site	out	9,890.4	1,200	10 : 46	4		
Reach to workshop	in	9,902.9	12,500	11 : 30	44		
Total			21,900		73	5	Total min.: 78 min.
Collection			0		0	4	
Transportation			19,000		65		
Inside the dumping site			2,900		8	1	Dumping time
Idling time							



**Time & Motion Study**

Organization: N.C.C

Trip- 3 Date: 26th May 1997

Vehicle No. KAB 389Q

Loading Capacity: 6.95 TON

Researcher's name: A.W. Mbogo

No. of Crew: 1

Estimated Volume: 3 m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,903		11 : 30			Dumping site
Loading-1	in	9,918	15,400	13 : 37	127		Huruma Corner
	out			13 : 42		5	
							To Dumping site at Dandora
Dumping site	in	9,922	3,300	13 : 50	8		
Start dumping		9,923	1,700	13 : 55	5		
Finish dumping				13 : 56		1	
Dumping site	out	9,925	1,300	13 : 59	3		
Reach to workshop	in	9,927	2,500	14 : 4	5		
Total			24,200		148	6	Total min.: 154 min.
Collection			0		0	5	
Transportation			21,200		140		
Inside the dumping site			3,000		8	1	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 4 Date: 26th May 1997

Vehicle No. KAB 389Q

Loading Capacity: 6.95 TON Researcher's name: A.W. Mbogo

No. of Crew: 1

Estimated Volume: 3 m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,927.1		14 : 4			
Loading-1	in	9,927.7	600	14 : 8	4		Huruma Corner
	out			14 : 13		5	
							To Dumping site-Dandora
Dumping site	in	9,931.0	3,300	14 : 22	9		Dandora
Start dumping		9,932.7	1,700	14 : 26	4		
Finish dumping				14 : 28		2	
Dumping site	out	9,934.0	1,300	14 : 36	8		
Reach to workshop	in						
Total			6,900		25	7	Total min.: 32 min.
Collection			0		0	5	
Transportation			3,900		13		
Inside the dumping site			3,000		12	2	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 5 Date: 26th May 1997

Vehicle No. KAB 389Q

Loading Capacity: 6.95 TON

Researcher's name: A.W. Mbogo

No. of Crew: 1

Estimated Volume: 3 m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start dumping	out	9,934		14 : 36			Dumpiong site
Loading-1	in	9,937	3,200	14 : 48	12		Huruma corner
	out						
							To Dumping site-Dandora
Dumping site	in	9,941	4,200	15 : 4	16		
Start dumping		9,943	1,200	15 : 8	4		
Finish dumping				15 : 9		1	
Dumping site	out	9,944	1,800	15 : 13	4		
Reach to workshop	in			15 : 40	27		
Total			10,400		63	1	Total min.: 64 min.
Collection			0		0	0	
Transportation			7,400		55		
Inside the dumping site			3,000		8	1	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 1 Date: 26th May 1997

Vehicle No. KAB 390Q

Loading Capacity: 6.95 TON

Researcher's name: E Kairu

No. of Crew: 2

Estimated Volume: 8m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,138.0		8 : 45			Kaloleni to Garage -Ngara Depot
Loading-1	in	9,153.0	15,000	10 : 44	119		Huruma Area
	out			10 : 46		2	
							To Dumping site through
							Juja road-Komarock road
							to Dandora
Dumping site	in	9,156.0	3,000	10 : 54	8		
Start dumping							
Finish dumping						0	
Dumping site	out	9,156.5	500	11 : 3	9		
Reach to workshop	in						
<b>Total</b>			<b>18,500</b>		<b>136</b>	<b>2</b>	<b>Total min.: 138 min.</b>
Collection			0		0	2	
Transportation			18,000		127		
Inside the dumping site			500		9	0	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 2 Date: 26th May 1997

Vehicle No. KAB 390Q

Loading Capacity: 6.95 TON

Researcher's name: E Kairu

No. of Crew: 2

Estimated Volume: 8m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,156.5		10 : 54			
Loading-1	in	9,163.0	6,500	11 : 15	21		Huruma area
	out			11 : 23		8	
							Same route to dumping as above
Dumping site	in	9,166.0	3,000	11 : 32	9		
Start dumping				11 : 41	9		
Finish dumping							
Dumping site	out				0		
Reach to workshop	in	9,166.5	500		0		
Total			10,000		39	8	Total min.: 47 min.
Collection			0		0	8	
Transportation			9,500		30		
Inside the dumping site			500		9	0	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 3 Date: 26th May 1997

Vehicle No. KAB 390Q

Loading Capacity: 6.95 TON

Researcher's name: E Kairu

No. of Crew: 2

Estimated Volume: 8m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,166.5		11 : 41			Dumping site
Loading-1	in	9,172.0	5,500	11 : 47	6		Huruma Area
	out			11 : 50		3	
							same route to Dumping
Dumping site	in	9,176.0	4,000	11 : 57	7		
Start dumping							
Finish dumping						0	
Dumping site	out	9,176.5	500	12 : 7	10		
Reach to workshop	in						
Total			10,000		23	3	Total min.: 26 min.
Collection			0		0	3	
Transportation			9,500		13		
Inside the dumping site			500		10	0	Dumping time
Idling time							

**Time & Motion Study**

Organization:N.C.C

Trip- 4 Date:26th May 1997

Vehicle No. KAB 390Q

Loading Capacity:6.95 TON

Researcher's name: E Kairu

No. of Crew: 2

Estimated Volume:8m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,176.5		12 : 7			Dumping site
Loading-1	in	9,182.0	5,500	12 : 13	6		Huruma area
	out			12 : 25		12	
Dumping site	in	9,185.0	3,000	12 : 31	6		
Start dumping							
Finish dumping						0	
Dumping site	out			12 : 41	10		
Reach to workshop	in	9,185.5	500				
Total			9,000		22	12	Total min.: 34 min.
Collection			0		0	12	
Transportation			8,500		12		
Inside the dumping site			500		10	0	Dumping time
Idling time							

**Time & Motion Study**

Organization:N.C.C

Trip- 5

Date:26th May 1997

Vehicle No. KAB 390Q

Loading Capacity:6.95 TON

Researcher's name: E Kairu

No. of Crew: 2

Estimated Volume:8m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,185.5		12 : 41			Dumping site
Loading-1	in	9,191.0	5,500	12 : 49	8		Huruma Area
	out			12 : 51		2	
Dumping site	in	9,195.0	4,000	12 : 58	7		
Start dumping							
Finish dumping						0	
Dumping site	out	9,195.5	500	13 : 6	8		
Reach to workshop	in						
Total			10,000		23	2	Total min.: 25 min.
Collection			0		0	2	
Transportation			95,000		15		
Inside the dumping site			500		8	0	Dumping time
Idling time							



**Time & Motion Study**

Organization: N.C.C

Trip- 6 Date: 26th May 1997

Vehicle No. KAB 390Q

Loading Capacity: 6.95 TON Researcher's name: E Kairu

No. of Crew: 2

Estimated Volume: 8m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,195.5		13 : 6			Dumping site
Loading-1	in	9,201.0	5,500	13 : 15	9		Huruma Area
	out			13 : 19		4	
							Same route to Dumping site
Dumping site	in	9,204.0	3,000	13 : 26	7		
Start dumping							
Finish dumping						0	
Dumping site	out			13 : 37	11		
Reach to workshop	in	9,024.5	500				
Total			9,000		27	4	Total min.: 31 min.
Collection			0		0	4	
Transportation			8,500		16		
Inside the dumping site			500		11	0	Dumping time
Idling time							

**Time & Motion Study**

Organization: N.C.C

Trip- 7 Date: 26th May 1997

Vehicle No. KAB 390Q

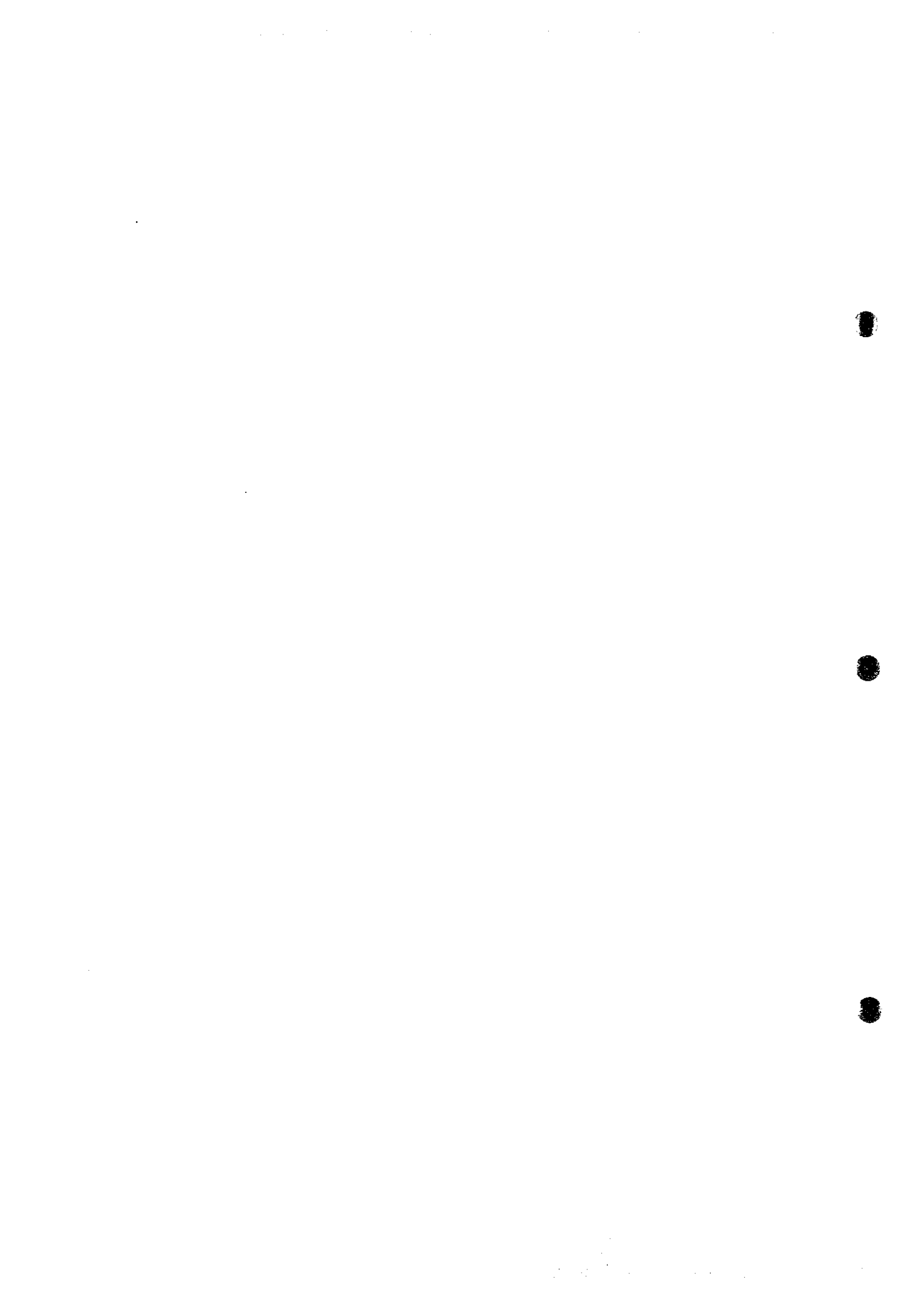
Loading Capacity: 6.95 TON

Researcher's name: E Kainu

No. of Crew: 2

Estimated Volume: 8m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	9,204.0		13 : 37			
Loading-1	in	9,210.0	6,000	13 : 44	7		Huruma
	out			13 : 48		4	
Dumping site	in	9,214.0	4,000	13 : 55	7		
Start dumping							
Finish dumping						0	
Dumping site	out	9,214.5	500	14 : 4	9		
Reach to workshop	in						
Total			10,500		23	4	Total min.: 27 min.
Collection			0		0	4	
Transportation			10,000		14		
Inside the dumping site			500		9	0	Dumping time
Idling time							



***BINS (NAIROBI) SERVICES LTD***



**Time & Motion Study**

Organization: BINS

Trip- I Date: 16th MAY 1997

Vehicle No. KAE 341U

Loading Capacity: 6TON

Researcher's name: Lennox M Kadere

No. of Crew: 5

Estimated Volume: 5.5

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	30262		9 : 45			The vehicle had a mechanic
Loading-1	in	30278	16,000	10 : 58	73		problem for repairing
	out	30278	0	11 : 17		19	Nairobi Parks
Loading-2	in	30299	21,000	12 : 48	91		Mauadi road-Kitui road-
	out	30299	0	14 : 56		128	Fibre Alass LTD
							Industrial area
Dumping site	in	30313.5	14,500	15 : 45	49		Dandara through James Osoao
Start dumping				15 : 50	5		road
Finish dumping				16 : 37		47	
Dumping site	out	30314	500	16 : 42	5		
Reach to workshop	in	30327	13,000	17 : 41	59		
Total			65,000		282	194	Total min.: 476 min.
Collection			21,000		91	147	
Transportation			43,500		161		
Inside the dumping site			500		10	47	Dumping
Idling time					20		Tea break 20min

**Time & Motion Study**

Organization: BINS

Trip- 1 Date: 16th MAY 1997

Vehicle No. KAE 386R

Loading Capacity: 6TON

Researcher's name: Esther K Charo

No. of Crew: 4

Estimated Volume: 7.3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	35224		8 : 4			
Loading-1	in	35228	4,000	8 : 16	12		Argwings Kodhek-Gitanga-
	out			8 : 30		14	James Gichuru-Hatheru-
Loading-2	in	35235	7,000	8 : 44	14		Gitanga-Thompson Estate
	out			8 : 47		3	
Loading-3	in	35236	1,000	8 : 48	1		
	out			8 : 53		5	
Loading-4	in			8 : 57	4		Mudhaya Rd
	out			9 : 0		3	
Loading-5	in	35238	2,000	9 : 4	4		
	out			9 : 7		3	
Loading-6	in	35240	2,000	9 : 9	2		
	out			9 : 12		3	
Loading-7	in			9 : 13	1		Gitanga Rd
	out			9 : 16		3	
Loading-8	in			9 : 17	1		James - Gishuru Rd
	out			9 : 22		5	
Loading-9	in	35243	3,000	9 : 28	6		
	out			9 : 30		2	
Loading-10	in	35244	1,000	9 : 31	1		Hatheru Rd
	out			9 : 33		2	
Loading-11	in			9 : 35	2		
	out			9 : 36		1	
Loading-12	in	35245	1,000	9 : 38	2		
	out			9 : 40		2	
Loading-13	in			9 : 43	3		
	out			9 : 48		5	
Loading-14	in			9 : 50	2		
	out			9 : 52		2	
Loading-15	in			9 : 56	4		Githanga Rd
	out			9 : 58		2	Thomsons Estate
Loading-16	in	35246	1,000	9 : 59	1		
	out			10 : 1		2	
Loading-17	in			10 : 3	2		
	out			10 : 9		6	
Loading-18	in			10 : 11	2		
	out			10 : 12		1	
Loading-19	in	35248	2,000	10 : 22	10		
	out			10 : 23		1	
Loading-20	in	35249	1,000	10 : 26	3		Gitanga Estate
	out			10 : 28		2	
Loading-21	in			10 : 31	3		
	out			10 : 32		1	to
Loading-22	in	35250	1,000	10 : 36	4		
	out			10 : 39		3	
Loading-23	in			10 : 44	5		Lerotgai Gardens
	out			10 : 46		2	to
Loading-24	in			10 : 49	3		Lavington Primary Scool
	out			10 : 53		4	
Loading-25	in	35251	1,000	10 : 55	2		to

**Time & Motion Study**

Organization: BINS

Trip- 1 Date: 16th MAY 1997

Vehicle No. KAE 386R

Loading Capacity: 6TON

Researcher's name: Esther K Charo

No. of Crew: 4

Estimated Volume: 7.3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
	out			10 : 56		1	
Loading-26	in			10 : 57	1		Githanga valley Ltd
	out			10 : 57		0	Githanga valley Ltd
Loading-27	in			10 : 58	1		Githanga valley Ltd
	out			10 : 59		1	
Loading-28	in			11 : 1	2		
	out			11 : 3		2	to
Loading-29	in			11 : 4	1		
	out			11 : 7		3	Lunde Rd
Loading-30	in			11 : 8	1		
	out			11 : 9		1	
Loading-31	in	35252	1,000	11 : 11	2		
	out			11 : 12		1	
Loading-32	in			11 : 14	2		To Hendred Avenue
	out			11 : 15		1	
Loading-33	in	35253	1,000	11 : 16	1		
	out			11 : 19		3	
Loading-34	in	35254	1,000	11 : 23	4		
	out			11 : 24		1	
Loading-35	in			11 : 25	1		Hendred avenue-Korosho
	out			11 : 26		1	
Loading-36	in			11 : 29	3		
	out			11 : 30		1	
Loading-37	in			11 : 30	0		Korosho Rd
	out			11 : 36		6	
Loading-38	in			11 : 38	2		
	out			11 : 40		2	
Loading-39	in	35255	1,000	11 : 41	1		to
	out			11 : 43		2	
Loading-40	in			11 : 47	4		
	out			11 : 51		4	
Loading-41	in	35256	1,000	11 : 52	1		Ole Dume Rd
	out			11 : 53		1	
Loading-42	in			11 : 55	2		
	out			11 : 57		2	
Loading-43	in	35257	1,000	11 : 59	2		
	out			12 : 1		2	to
Loading-44	in			12 : 2	1		Marakwet
	out			12 : 4		2	
Loading-45	in	35258	1,000	12 : 10	6		to
	out			12 : 12		2	
Loading-46	in			12 : 14	2		Red rose court
	out			12 : 17		3	to
Loading-47	in			12 : 20	3		Kirichwa
	out			12 : 32		12	
Loading-48	in			12 : 35	3		
	out			12 : 36		1	to chania Rd
Loading-49	in	35259	1,000	12 : 38	2		
	out			12 : 40		2	
Loading-50	in			12 : 41	1		
	out			12 : 47		6	
Loading-51	in			12 : 48	1		



**Time & Motion Study**

Organization: BINS

Trip- 1 Date: 16th MAY 1997

Vehicle No. KAE 386R

Loading Capacity: 6TON

Researcher's name: Esther K Charo

No. of Crew: 4

Estimated Volume: 7.3

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
			12 : 50		2	
Loading-52	35260	1,000	12 : 51	1		
			12 : 53		2	
Loading-53			12 : 54	1		Chania Rd
			12 : 57		3	to
Loading-54			12 : 59	2		Wood Gardens
			13 : 0		1	
Loading-55	35261	1,000	13 : 1	1		to
			13 : 2		1	
Loading-56			13 : 3	1		Chania Avenue
			13 : 5		2	
Loading-57	35262	1,000	13 : 7	2		
			13 : 10		3	to
Loading-58			13 : 11	1		
			13 : 12		1	
Loading-59			13 : 13	1		Comolane
			13 : 16		3	
Loading-60	35263	1,000	13 : 18	2		
			13 : 19		1	
Loading-61			13 : 20	1		
			13 : 22		2	
Loading-62			13 : 25	3		
			13 : 26		1	
Loading-63			13 : 28	2		French school to Thika Rd to
			13 : 34		6	Dumping site dandora
Loading-64	35278	15,000	14 : 0	26		
			14 : 13		13	
Dumping site	35282	4,000	14 : 32	19		Dandora through Thika road
Start dumping			14 : 34			
Finish dumping			15 : 6			
Dumping site	35282	0	15 : 9	37		
Reach to workshop			:			
Total		58,000		244	181	Total min.: 425 min.
Collection		50,000		176	181	
Transportation		8,000		31	0	
Inside the dumping site		0		37	0	Dumping time
Idling time						

**Time & Motion Study**

Organization: BINS

Trip-2 Date: 16th MAY 1997

Vehicle No. KAF 386R

Loading Capacity: 6TON

Researcher's name: Esther K Charo

No. of Crew: 4

Estimated Volume: 7.3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	35282		15 : 9			From Dandora to A/Kodheck
Loading-1	in	35303	21,000	16 : 0	51		Rd. to
	out			16 : 21		21	Marcus Rd
Loading-2	in	35305	2,000	16 : 23	2		
	out			16 : 25		2	to
Loading-3	in			16 : 27	2		
	out			16 : 28		1	
Loading-4	in	35306	1,000	16 : 31	3		
	out			16 : 32		1	
Loading-5	in	35307	1,000	16 : 35	3		Lustman
	out			16 : 56		21	to
Loading-6	in			16 : 59	3		Teresia Kyalo
	out			17 : 5		6	to
Loading-7	in	35308	1,000	17 : 10	5		Kirichnia Garden
	out			17 : 12		2	
Loading-8	in			17 : 14	2		Noege
	out			17 : 17		3	Gitanga road to Nanga road
Loading-9	in	35311	3,000	17 : 27	10		
	out			17 : 33		6	
Loading-10	in						
Dumping site	in				0		From Heritage through
Start dumping							Vanga road to work shop
Finish dumping							
Dumping site	out				0		
Reach to workshop	in	35325	14,000	18 : 9	36		
Total			43,000		117	63	Total min.: 180min.
Collection			28,000		78	63	
Transportation			15,000		39	0	
Inside the dumping site			0		0	0	Dumping time
Idling time							

**Time & Motion Study**

Organization: BINS

Trip- 1 Date: 16th May 1997

Vehicle No. KAE 441W

Loading Capacity: 6.5 tons

Researcher's name: Michael J. Gonda

No. of Crew: 5

Estimated Volume: 7 tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out		0	8 : 5			Went to a filling station
Loading-1	in		2,000	8 : 35	30		On Ngong rd. colocation done
	out		20	8 : 40		5	within
Loading-2	in		100	9 : 0	20		On Ngong rd. colocation done
	out		0	9 : 5		5	within
Loading-3	in		150	9 : 7	2		On Ngong rd. colocation done
	out		0	9 : 9		2	within
Loading-4	in		400	9 : 12	3		On Ngong rd. colocation done
	out		0	9 : 15		3	within
Loading-5	in		100	9 : 17	2		On Ngong rd. colocation done
	out		0	9 : 20		3	within
Loading-6	in		600	9 : 22	2		On Ngong rd. colocation done
	out		0	9 : 27		5	within
Loading-7	in		400	9 : 30	3		Began Collection on Riara rd.
	out		0	9 : 36		6	Collection done within
Loading-8	in		800	9 : 40	4		Began Collection on Riara rd.
	out		0	9 : 42		2	Collection done within
Loading-9	in		400	9 : 47	5		Began Collection on Riara rd.
	out		0	9 : 49		2	Collection done within
Loading-10	in		100	9 : 50	1		Began Collection on Riara rd.
	out		0	9 : 56		6	Collection done within
Loading-11	in		50	9 : 58	2		Began Collection on Riara rd.
	out		0	10 : 2		4	Collection done within
Loading-12	in		700	10 : 4	2		Began Collection on Riara rd.
	out		0	10 : 6		2	Collection done within
Loading-13	in		100	10 : 8	2		Began Collection on Riara rd.
	out		0	10 : 12		4	Collection done within
Loading-14	in		400	10 : 14	2		Began Collection on Riara rd.
	out		0	10 : 16		2	Collection done within
Loading-15	in		800	10 : 24	8		Began Collection on Riara rd.
	out		0	10 : 34		10	Collection done within
Loading-16	in		400	10 : 37	3		
	out		0	10 : 40		3	
Loading-17	in		1,000	10 : 41	1		Still operating in Riara within
	out		0	10 : 44		3	
Loading-18	in		200	10 : 46	2		Still operating in Riara within
	out		0	10 : 47		1	
Loading-19	in		500	10 : 50	3		Still operating in Riara within
	out		0	10 : 52		2	
Loading-20	in		50	10 : 53	1		Still operating in Riara within
	out		0	10 : 55		2	
Loading-21	in		100	10 : 57	2		Still operating in Riara within
	out		0	10 : 59		2	
Loading-22	in		200	11 : 2	3		Still operating in Riara within
	out		0	11 : 2		0	
Loading-23	in		50	11 : 3	1		Still operating in Riara within
	out		0	11 : 3		0	

**Time & Motion Study**

Organization: BINS

Trip- 1 Date: 16th May 1997

Vehicle No. KAE 441W

Loading Capacity: 6.5 tons

Researcher's name: Michael J. Gonda

No. of Crew: 5

Estimated Volume: 7 tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-24	in		100	11 : 4	1		Ole odume rd. within
	out		0	11 : 4		0	
Loading-25	in		300	11 : 6	2		Ole odume rd. within
	out		0	11 : 7		1	
Loading-26	in		200	11 : 9	2		Ndemi rd. within
	out		0	11 : 9		0	
Loading-27	in		500	11 : 11	2		Ndemi rd. within
	out		0	11 : 14		3	
Loading-28	in		50	11 : 14	0		Ndemi rd. within
	out		0	11 : 15		1	
Loading-29	in		800	11 : 16	1		Ndemi rd. within
	out		0	11 : 16		0	
Loading-30	in		100	11 : 17	1		Kilungu rd. within
	out		0	11 : 17		0	
Loading-31	in		800	11 : 17	0		Kilungu rd. within
	out		0	11 : 18		1	
Loading-32	in		400	11 : 19	1		Kilungu rd. within
	out		0	11 : 21		2	
Loading-33	in		100	11 : 22	1		Area operation in Adams Arcade
	out		0	11 : 23		1	
Loading-34	in		300	11 : 24	1		Area operation in Adams Arcade
	out		0	11 : 24		0	
Loading-35	in		1,000	11 : 27	3		Area operation in Adams Arcade
	out		0	11 : 28		1	
Loading-36	in		20	11 : 28	0		Area operation in Adams Arcade
	out		0	11 : 29		1	
Loading-37	in		200	11 : 31	2		Area operation in Adams Arcade
	out		0	11 : 32		1	
Loading-38	in		50	11 : 32	0		Area operation in Adams Arcade
	out		0	11 : 33		1	
Loading-39	in		100	11 : 34	1		Had a lunch break up to 12:00
	out		0	11 : 35		1	noon from 11:36am
Loading-40	in		40	11 : 35	0		
	out		0	11 : 36		1	Area operation in Kibera
Loading-41	in		2,000	12 : 9	33		
	out		0	12 : 10		1	
Loading-42	in		2,000	12 : 15	5		
	out		0	12 : 17		2	
Loading-43	in		800	12 : 20	3		Operation in Rabnet rd.
	out		0	12 : 22		2	
Loading-44	in		400	12 : 24	2		
	out		0	12 : 25		1	
Loading-45	in		300	12 : 26	1		
	out		0	12 : 30		4	Back to Ngong rd.
Loading-46	in		200	12 : 31	1		
	out		0	12 : 32		1	

**Time & Motion Study**

Organization: BINS

Trip- 1 Date: 16th May 1997

Vehicle No. KAE 441W

Loading Capacity: 6.5 tons

Researcher's name: Michael J. Gonda

No. of Crew: 5

Estimated Volume: 7 tons

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-47	in	100	12 : 33	1		
	out	0	12 : 35		2	
Loading-48	in	400	12 : 37	2		
	out	0	12 : 38		1	
Loading-49	in	300	12 : 40	2		Operation area in Kindaruma rd.
	out	0	12 : 42		2	
Loading-50	in	500	12 : 43	1		Operation area in Kindaruma rd.
	out	0	12 : 45		2	
Loading-51	in	50	12 : 46	1		Operation area in Kindaruma rd.
	out	0	12 : 47		1	
Loading-52	in	100	12 : 49	2		Operation area in Kindaruma rd.
	out	0	12 : 51		2	
Loading-53	in	200	12 : 52	1		Operation area in Kindaruma rd.
	out	0	12 : 55		3	
Loading-54	in	500	12 : 57	2		Operation area in Kindaruma rd.
	out	0	12 : 59		2	
Loading-55	in	1,000	13 : 5	6		Yaya Center
	out	0	13 : 6		1	
Loading-56	in	800	13 : 7	1		Yaya Center
	out	0	13 : 9		2	
Loading-57	in	100	13 : 9	0		Yaya Center
	out	0	13 : 12		3	
Loading-58	in	400	13 : 16	4		Yaya Center
	out	0	13 : 24		8	
Loading-59	in	800	13 : 26	2		Yaya Center
	out	0	13 : 27		1	
Loading-60	in	600	13 : 29	2		Mbaruk rd.(Gumo, City
	out	0	13 : 34		5	Mortuary, Sunrise)
Loading-61	in	50	13 : 34	0		Mbaruk rd.(Gumo, City
	out	0	13 : 35		1	Mortuary, Sunrise)
Loading-62	in	400	13 : 37	2		Mbaruk rd.(Gumo, City
	out	0	13 : 42		5	Mortuary, Sunrise)
Loading-63	in	200	13 : 46	4		Mbaruk rd.(Gumo, City
	out	0	13 : 49		3	Mortuary, Sunrise)
Loading-64	in	150	14 : 1	12		Mbaruk rd.(Gumo, City
	out	0	14 : 2		1	Mortuary, Sunrise)
Loading-65	in	100	14 : 2	0		Still operating in Gumo Sunview
	out	0	14 : 4		2	Highview Golf course estates
Loading-66	in	50	14 : 8	4		
	out	0	14 : 9		1	
Loading-67	in	1,000	14 : 20	11		
	out	0	14 : 22		2	
Loading-68	in	500	14 : 25	3		Collection done within
	out	0	14 : 26		1	
Loading-69	in	100	14 : 27	1		Collection done within
	out	0	14 : 30		3	

**Time & Motion Study**

Organization: BINS

Trip- 1 Date: 16th May 1997

Vehicle No. KAE 441W

Loading Capacity: 6.5tons

Researcher's name: Michael J. Gonda

No. of Crew: 5

Estimated Volume: 7 tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-70	in		1,000	14 : 35	5		Collection done within
	out		0	14 : 36		1	
Loading-71	in		100	14 : 37	1		Collection done within
	out		0	14 : 39		2	
Loading-72	in		200	14 : 41	2		Collection done within
	out		0	14 : 42		1	
Loading-73	in		800	14 : 47	5		Collection done within
	out		0	14 : 49		2	
Loading-74	in		400	14 : 50	1		Collection done within
	out		0	14 : 52		2	
Loading-75	in		200	14 : 53	1		Collection done within
	out		0	14 : 54		1	
Loading-76	in		30	14 : 54	0		Collection done within
	out		0	14 : 55		1	
Loading-77	in		200	14 : 57	2		Collection done within
	out		0	14 : 59		2	
Loading-78	in		500	15 : 4	5		Collection done within
	out		0	15 : 5		1	
Loading-79	in		150	15 : 6	1		Collection done within
	out		0	15 : 7		1	
Loading-80	in		80	15 : 8	1		Collection done within
	out		0	15 : 9		1	
Loading-81	in		400	15 : 10	1		Kenyatta area
	out		0	15 : 12		2	
Loading-82	in		1,200	15 : 16	4		Kenyatta area
	out		0	15 : 17		1	
Loading-83	in		1,000	15 : 24	7		Kenyatta area
	out		0	15 : 26		2	
Loading-84	in		800	15 : 27	1		Community operation
	out		0	15 : 44		17	
Loading-85	in		400	15 : 46	2		Community operation
	out		0	15 : 48		2	
Loading-86	in		900	15 : 52	4		Community operation
	out		0	15 : 57		5	
Loading-87	in		400	16 : 0	3		Community operation
	out		0	16 : 4		4	
Loading-88	in		800	16 : 6	2		Community operation
	out		0	16 : 7		1	
Loading-89	in		100	16 : 7	0		Community operation
	out		0	16 : 9		2	
Loading-90	in		400	16 : 11	2		Upper hill area
	out		0	16 : 12		1	
Loading-91	in		50	16 : 13	1		Upper hill area
	out		0	16 : 20		7	
Loading-92	in		400	16 : 21	1		Upper hill area
	out		0	16 : 22		1	

**Time & Motion Study**

Organization: BINS

Trip- 1 Date: 16th May 1997

Vehicle No. KAE 441W

Loading Capacity: 6.5 tons

Researcher's name: Michael J. Gonda

No. of Crew: 5

Estimated Volume: 7 tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-93	in		300	16 : 23	1		Upper hill area
	out		0	16 : 26		3	
Loading-94	in		800	16 : 29	3		Upper hill area
	out		0	16 : 35		6	
Loading-95	in		80	16 : 35	0		Upper hill area
	out		0	16 : 39		4	
Loading-96	in		50	16 : 40	1		Upper hill area
	out		0	16 : 42		2	
Loading-97	in		800	16 : 46	4		Nyayo station area
	out		0	16 : 47		1	
Loading-98	in		900	16 : 50	3		Nyayo station area
	out		0	16 : 51		1	
Loading-99	in		800	16 : 54	3		Nyayo station area
	out		0	16 : 56		2	
Loading-100	in		80	16 : 57	1		After loading point 105 the
	out		0	16 : 58		1	track did not go to the dumping
Loading-101	in		50	16 : 58	0		site rather it went straight to
	out		0	16 : 59		1	the workshop
Loading-102	in		200	17 : 0	1		
	out		0	17 : 2		2	
Loading-103	in		150	17 : 3	1		
	out		0	17 : 5		2	
Loading-104	in		200	17 : 6	1		
	out		0	17 : 10		4	
Loading-105	in		150	17 : 12	2		
	out		0	17 : 16		4	
				:			
				:			
Dumping site	in						
Start dumping							
Finish dumping							
Dumping site	out						
Reach to workshop	in		16,000	17 : 36	20		
Total			59,850		324	247	Total min. 571 min.
Collection			41,850		250	247	
Transportation			18,000		50	0	
Inside the dumping site			0		0	0	Dumping time
Idling time					24		

### Time & Motion Study

Organization: BINS

Trip-1 Date: 16th MAY 1997

Vehicle No. KAE 593

Loading Capacity: 3TON

Researcher's name: K M Mwakutema

No. of Crew: 3

Estimated Volume: 13

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	60479		8 : 10			Kampala to Lusaka (1hr 20min.)
Loading-1	in	60488	9,000	9 : 58	108		spent for tyre repair and filling
	out			10 : 0		2	petrol mileage 60483
Loading-2	in	60489	1,000	10 : 5	5		L-1 Lusaka to Kitoi
	out			10 : 8		3	L-2 Kitoi to Busia
Loading-3	in	60490	1,000	10 : 11	3		Busia to Enterprises
	out			10 : 16		5	
Loading-4	in			10 : 19	3		Enterprises to Isiolo
	out			10 : 20		1	
Loading-5	in	60492	2,000	10 : 26	6		Isiolo to Garage
	out			10 : 28		2	
Loading-6	in			10 : 32	4		Garage to Dares-salam
	out			10 : 34		2	
Loading-7	in			10 : 36	2		Dares-salam to Dunga
	out			11 : 45		69	
Loading-8	in	60493	1,000	11 : 58	13		Dunga to Shimola town
	out			12 : 28		30	Lunch break for 22min
Loading-9	in	60498	5,000	13 : 10	42		Bunyala to Factory
	out			13 : 12		2	
Loading-10	in	60500	2,000	13 : 21	9		Factory to Lusaka
	out			13 : 28		7	
Loading-11	in			13 : 32	4		Lusaka to Addis -Ababa
	out			13 : 33		1	
Loading-12	in	60506	6,000	13 : 45	12		Addis to Enterprise
	out			13 : 50		5	
Loading-13	in	60507	1,000	13 : 55	5		Enterprise
	out			13 : 56		1	
Loading-14	in	60513	6,000	14 : 18	22		Enterprise to sasio
	out			14 : 30		12	
Loading-15	in			14 : 34	4		Sasio to Lunga-Lunga
	out			14 : 42		8	
Loading-16	in	60514	1,000	14 : 45	3		Lunga-Lunga road
	out			15 : 3		18	
Dumping site	in	60535	21,000	16 : 20	77		L-Lunga to dumping
Start dumping							
Finish dumping							
Dumping site	out	60536	1,000	17 : 0	40		
Reach to workshop	in	60547	11,000	17 : 40	40		
Total			68,000		402	168	Total min.: 570 min.
Collection			26,000		115	168	
Transportation			41,000		145	0	
Inside the dumping site			1,000		40	0	Dumping time
Idling time					102		



**Time & Motion Study**

Organization: BINS

Trip-1

Date: 16th, MAY 1997

Vehicle No. KAE 761R

Loading Capacity: 2.69 TON

Researcher's name: Lilian M Mumbo

No. of Crew: 5

Estimated Volume: 2.65

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	22645		8 : 15			Light Garbage
Loading-1	in	22653	8,000	8 : 46	31		Lunga Lunga road
	out			10 : 0		74	
Dumping site	in	22667	14,000	10 : 50	50		
Start dumping							
Finish dumping							
Dumping site	out	22669	2,000	11 : 24	34		
Reach to workshop	in						
Total			24,000		115	74	Total min.: 189 min.
Collection			0		0	74	
Transportation			22,000		81		
Inside the dumping site			2,000		34	0	Dumping time
Idling time							

**Time & Motion Study**

Organization: BINS

Trip-2 Date: 16th, MAY 1997

Vehicle No. KAE 761R

Loading Capacity: 2.69TON

Researcher's name: Lilian M Mumbo

No. of Crew: 5

Estimated Volume: 2.65

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	22669		11 : 24			
Loading-1	in	22682	13,000	12 : 14	50		
	out			12 : 15		1	
Loading-2	in			12 : 15	0		
	out			12 : 17		2	
Loading-3	in			12 : 19	2		
	out			12 : 20		1	
Loading-4	in	22686	4,000	12 : 23	3		
	out			12 : 24		1	
Loading-5	in	22689	3,000	12 : 29	5		
	out			12 : 29		0	
Loading-6	in			12 : 33	4		
	out			12 : 33		0	
Loading-7	in			12 : 34	1		
	out			12 : 34		0	
Loading-8	in			12 : 34	0		
	out			12 : 34		0	
Loading-9	in	22690	1,000	12 : 35	1		
	out			12 : 49		14	
Loading-10	in			12 : 50	1		
	out			12 : 51		1	
Loading-11	in			12 : 55	4		
	out			12 : 56		1	
Loading-12	in			12 : 58	2		
	out			12 : 58		0	
Loading-13	in	22692	2,000	13 : 4	6		
	out			13 : 6		2	
Loading-14	in			13 : 10	4		
	out			13 : 11		1	
Loading-15	in	22693	1,000	13 : 14	3		
	out			13 : 16		2	
Loading-16	in	22694	1,000	13 : 20	4		
	out			13 : 25		5	
Loading-17	in			13 : 26	1		23 min lunch
	out			13 : 32		6	
Loading-18	in			13 : 36	4		
	out			13 : 59		23	
Loading-19	in			14 : 0	1		
	out			14 : 17		17	
Loading-20	in	22695	1,000	14 : 19	2		
	out			14 : 26		7	
Loading-21	in			14 : 30	4		
	out			14 : 36		6	
Loading-22	in	22696	1,000	14 : 36	0		
	out			14 : 44		8	
Loading-23	in	22697	1,000	14 : 46	2		
	out			14 : 48		2	
Loading-24	in			14 : 58	10		
	out			15 : 1		3	

**Time & Motion Study**

Organization: BINS

Trip-2 Date: 16th, MAY 1997

Vehicle No. KAE 761R

Loading Capacity: 2.69TON

Researcher's name: Lilian M Mumbo

No. of Crew: 5

Estimated Volume: 2.65

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-25	in	22698	1,000	15 : 4	3		
	out			15 : 6		2	
Loading-26	in			15 : 11	5		
	out			15 : 14		3	
Loading-27	in			15 : 15	1		
	out			15 : 21		6	
Loading-28	in	22699	1,000	15 : 23	2		
	out			15 : 28		5	
Loading-29	in	22700	1,000	15 : 30	2		
	out			15 : 32		2	
Loading-30	in	22701	1,000	15 : 38	6		1 hour 11 min break down
	out			16 : 49		71	
Loading-31	in			16 : 58	9		
	out			17 : 5		7	
Dumping site	in						
Start dumping							
Finish dumping							
Dumping site	out						
Reach to workshop	in	22710	9,000	18 : 14	69		
Total			41000		211	199	Total min.: 410 min.
Collection			32,000		142	105	
Transportation			9,000		69		
Inside the dumping site			0		0	0	Dumping time
Idling time						94	

**Time & Motion Study**

Organization: BINS

Trip- 1 Date: 16th MAY 1997

Vehicle No. KOY 636

Loading Capacity: 12TON

Researcher's name: Janwaris Kioko

No. of Crew: 6

Estimated Volume: 0.1

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			8 : 15			via Langata Rd to Amimai
Loading-1	in			8 : 35	20		orphanage
	out			8 : 45		10	Carniumore (Wilson area)
Loading-2	in			8 : 55	10		
	out			10 : 20		85	
Loading-3	in			10 : 50	30		Elliots Ltd Changamwe Rd throug
	out			12 : 10		80	Lusaka Rd Enterprise Rd
Loading-4	in			12 : 25	15		Mestte foods pate Rd Lunga via
	out			12 : 30		5	Enterprise Rd
Loading-5	in						NB:
	out						We had a stop at Horuma Estate (chokora) to unload as from 1:15-1:40
							We had a stop at a ganga at buru-buru for vehicle coor repair from 3:50-4:10
Dumping site	in			14 : 10	100		
Start dumping				14 : 15	5		The experienced problem was wit
Finish dumping				15 : 20		65	the Meter of the vehicle was not i
Dumping site	out			15 : 30	10		condition
Reach to workshop	in			16 : 30	60		Jogoo, buruburu, via Kariobangi to Dandora
Total			0		250	245	Total min.: 495 min.
Collection			0		55	180	
Transportation			0		135		
Inside the dumping site			0		15	65	Dumping time
Idling time					45		

**Time & Motion Study**

Organization: BINS

Trip- 1 Date: 16th MAY 1997

Vehicle No. KST 976

Loading Capacity: 2.5TON

Researcher's name: Ann J Canter

No. of Crew: 4

Estimated Volume: 7.875

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			8 : 5			
Loading-1	in			8 : 25	20		Steers Hotel (Tom Mboya st)
	out			8 : 45		20	
Loading-2	in			8 : 51	6		City Nursing Home (Mfangand st)
	out			8 : 55		4	
Loading-3	in			9 : 2	7		Parkway Investments (Uniontowe
	out			9 : 10		8	
Loading-4	in			9 : 11	1		Eagle House
	out			9 : 20		9	
Loading-5	in			9 : 23	3		Queensway House
	out			9 : 35		12	
Loading-6	in			9 : 40	5		Lukes Ltd. (Elite abcate bld)
	out			9 : 45		5	
Loading-7	in			9 : 50	5		McDonnas
	out			9 : 50		0	
Loading-8	in			9 : 53	3		Steers (hotel)
	out			10 : 13		20	(Muhindi Bingu)
Loading-9	in			10 : 22	9		Ricshaw chinese
	out			10 : 40		18	Restaurant (fedha towers)
Loading-10	in			10 : 51	11		Norfolk Hotel (Harry thuku Rd)
	out			11 : 0		9	Thuku road
Dumping site	in			11 : 44	44		From Museum road to forest
Start dumping							road-Murange-Thika-Outer
Finish dumping							Ring-Kololeni road
Dumping site	out			11 : 55	11		to Dandora
Reach to workshop	in						
Total			0		125	105	Total min.: 230 min.
Collection			0		65	105	
Transportation			0		49		
Inside the dumping site			0		11	0	Dumping time
Idling time							

**Time & Motion Study**

Organization: BINS

Trip- 2 Date: 16th MAY 1997

Vehicle No. KST 976

Loading Capacity: 2.5TON

Researcher's name: Ann J Canter

No. of Crew: 4

Estimated Volume: 7.875

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			11 : 55			
Loading-1	in			12 : 22	27		Longonot Place( Kijabe st)
	out			13 : 4		42	
Loading-2	in			13 : 8	4		Norfolk Tower (Harry Thuku Rd)
	out			13 : 11		3	
Loading-3	in			13 : 20	9		Chester House
	out			14 : 55		95	
Loading-4	in			15 : 0	5		Norfolk Towers (Harry thuku Rd)
	out			15 : 12		12	
Loading-5	in			15 : 15	3		(Market Branch)
	out			15 : 20		5	Babelavys Bank
Loading-6	in			15 : 25	5		ABN AMBBD Bank
	out			15 : 35		10	
Dumping site	in			16 : 7	42		Dandora
Start dumping							
Finish dumping							
Dumping site	out			16 : 38	31		
Reach to workshop	in			17 : 0	22		
Total			0		148	167	Total min.: 315 min.
Collection			0		26	167	
Transportation			0		91	0	
Inside the dumping site			0		31	0	Dumping time
Idling time							

**Time & Motion Study**

Organization: BINS

Trip- 1 Date: 16th MAY 1997

Vehicle No. KXF 820

Loading Capacity: 7TON

Researcher's name: Purity Wanjiru

No. of Crew: 5

Estimated Volume: 7.5

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop out			8 : 2			The vehicle (truck) was parked
						The previous day so we headed
						to Dandora to dump through
						Kariobangi
						It takes about 1hr a distance of
						14 km
						The area of dumping is quite big
						the truck takes some time to
						reach the dumping site spot
Dumping site in		14,000	8 : 50	48		Again it unloading by hands
Start dumping			8 : 56	6		thus taking much time to empty
Finish dumping			10 : 0		64	a whole truck of heavy bags
Dumping site out		500	10 : 4	4		
Reach to workshop in						
Total		14,500		58	64	Total min.: 122 min.
Collection		0		0	0	
Transportation		14,000		48	0	
Inside the dumping site		500		10	64	Dumping time
Idling time						

**Time & Motion Study**

Organization: BINS

Trip-2 Date: 16th MAY 1997

Vehicle No. KXF 820

Loading Capacity: 7TON

Researcher's name: Purity Wanjiru

No. of Crew: 5

Estimated Volume: 3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			10 : 6			From dandora dumping area t
Loading-1	in			10 : 42	36		loading points through Muran
	out			11 : 4		22	road-Limuru road-to Aga
Loading-2	in			11 : 13	9		Khan Sports sentre
	out			11 : 25		12	
Loading-3	in			11 : 28	3		
	out			11 : 30		2	
Loading-4	in			11 : 31	1		Plums Hotel
	out			11 : 32		1	
Loading-5	in			11 : 32	0		
	out			11 : 32		0	
Loading-6	in			11 : 33	1		Chiromo road
	out			11 : 35		2	
Loading-7	in			11 : 38	3		
	out			11 : 40		2	
Loading-8	in			11 : 42	2		Kaskazi lane
	out			11 : 46		4	
Loading-9	in			11 : 46	0		
	out			11 : 47		1	
Loading-10	in			11 : 48	1		Muthithi road
	out			11 : 50		2	
Loading-11	in			11 : 51	1		
	out			11 : 52		1	
Loading-12	in			11 : 53	1		Mpaka road between
	out			11 : 54		1	Muthithi and Parklands
Loading-13	in			11 : 56	2		road
	out			12 : 0		4	
Loading-14	in			12 : 3	3		
	out			12 : 4		1	Chiromo road
Loading-15	in			12 : 6	2		
	out			12 : 22		16	
Loading-16	in			12 : 26	4		
	out			12 : 32		6	
Loading-17	in			12 : 33	1		Westlands road
	out			12 : 38		5	
Loading-18	in			12 : 39	1		
	out			12 : 42		3	Parklands
Loading-19	in			12 : 45	3		
	out			12 : 47		2	
Loading-20	in			12 : 48	1		
	out			12 : 50		2	
Loading-21	in			12 : 51	1		High bridge
	out			12 : 52		1	
Loading-22	in			12 : 54	2		
	out			12 : 59		5	
Loading-23	in			13 : 0	1		
				13 : 1		1	
Loading-24	in			13 : 2	1		
	out			13 : 8		6	



**Time & Motion Study**

Organization: BINS

Trip-2 Date: 16th MAY 1997

Vehicle No. KXF 820

Loading Capacity: 7TON

Researcher's name: Purity Wanjiru

No. of Crew: 5

Estimated Volume: 3

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-25	in		13 : 10	2		
	out		13 : 14		4	
Loading-26	in		13 : 16	2		
	out		13 : 17		1	
Loading-27	in		13 : 18	1		Lunch break (30min)
	out		13 : 19		1	
Loading-28	in		13 : 59	40		
	out		14 : 3		4	Uhuru highway
Loading-29	in		14 : 5	2		
	out		14 : 42		37	
Loading-30	in		14 : 45	3		Langata road
	out		15 : 5		20	
Loading-31	in		15 : 6	1		
	out		15 : 20		14	Wilson airport
Loading-32	in		15 : 32	12		
	out		15 : 49		17	
Loading-33	in		15 : 51	2		From Wilson airport
	out		16 : 0		9	
Loading-34	in		16 : 3	3		car and general motors
	out		16 : 10		7	
Loading-35	in		16 : 21	11		
	out		16 : 27		6	Lusaka road
Loading-36	in		16 : 29	2		
	out					LMC
Dumping site	in					
Start dumping						
Finish dumping						back to the workshop
Dumping site	out					
Reach to workshop	in		16 : 40	11		
Total		0		172	222	Total min.: 394 min.
Collection		0		95	222	
Transportation		0		47	0	
Inside the dumping site		0		0	0	Dumping time
Idling time				30		Lunch break 30min

**Time & Motion Study**

Organization: BINS

Trip- 1 Date: 16th MAY 1997

Vehicle No. KZV 006

Loading Capacity: 3TON

Researcher's name: Margaret Mwangi

No. of Crew: 4

Estimated Volume: 4

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	146436		8 : 27			Westlands road
Loading-1	in	146440	4,000	9 : 13	46		Thomas Barnados
	out			9 : 16		3	
Loading-2	in	146441	1,000	9 : 33	17		Rank Xerox
	out			9 : 41		8	
Loading-3	in	146442	1,000	9 : 44	3		Pamstech House
	out			9 : 45		1	
Loading-4	in	146447	5,000	9 : 47	2		Apic Centre
	out			9 : 50		3	
Loading-5	in	146449	2,000	9 : 55	5		Chaahat restaurant
	out			9 : 57		2	
Loading-6	in	146450	1,000	9 : 59	2		Iguana restaurant
	out			10 : 12		13	
Loading-7	in	146504	54,000	10 : 15	3		Shimmers Plaza
	out			10 : 16		1	
Loading-8	in	146506	2,000	10 : 17	1		Photo jom
	out			10 : 36		19	
Loading-9	in	146510	4,000	10 : 45	9		Rubby Printers
	out			10 : 48		3	
Loading-10	in	146513	3,000	10 : 58	10		Duruga restaurant
	out			11 : 0		2	
Loading-11	in	146515	2,000	11 : 13	13		Forest Court
	out			11 : 53		40	
Loading-12	in	146517	2,000	12 : 1	8		Chinese Restrant
	out			12 : 2		1	
Loading-13	in	146518	1,000	12 : 8	6		Embassy court
	out			12 : 10		2	
Loading-14	in	146521	3,000	12 : 20	10		Oje Chucles
	out			12 : 23		3	
Loading-15	in	146523	2,000	12 : 35	12		40min break for lunch
	out			12 : 38		3	
Loading-16	in	146525	2,000	13 : 20	42		Oje Chucles
	out			13 : 24		4	
Loading-17	in	146529	4,000	13 : 36	12		Omars
	out			13 : 38		2	
Dumping site	in	146547	18,000	14 : 26	48		Dandora
Start dumping							
Finish dumping							
Dumping site	out	146549	2,000	15 : 15	49		
Reach to workshop	in						
Total			113,000		298	110	Total min.: 408 min.
Collection			89,000		115	110	
Transportation			22,000		94	0	
Inside the dumping site			2,000		49	0	Dumping time
Idling time					40		

**Time & Motion Study**

Organization: BINS

Trip- 2 Date: 16th MAY 1997

Vehicle No. KZV 006

Loading Capacity: 3TON

Researcher's name: Margaret Mwangi

No. of Crew: 4

Estimated Volume: 4

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	146549		15 : 15			Westlands road
Loading-1	in	146563	14,000	15 : 57	42		Renana house
	out			16 : 40		43	to workshop
Loading-2	in						
	out						
Loading-3	in						
	out						
Loading-4	in						
	out						
Loading-5	in						
	out						
Dumping site	in						
Start dumping							
Finish dumping							
Dumping site	out						
Reach to workshop	in	146575	12,000	17 : 5	25		
<b>Total</b>			<b>26,000</b>		<b>67</b>	<b>43</b>	<b>Total min.: 110 min.</b>
Collection			0		0	43	
Transportation			26,000		67		
Inside the dumping site			0		0	0	Dumping time
Idling time							

**Time & Motion Study**

Organization: BINS (NAIROBI) Trip- 1 Date: 17/05/97

Vehicle No. KAD 794Y

Loading Capacity: 5 TON

Researcher's name: J. KIOKO

No. of Crew: 5

Estimated Volume: 7.85M3

Location		Mileage (Km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	48057		8 : 20			8:30 to 8:40 fuelling
Loading-1	in	48065	8,000	8 : 50	30		Day star university
	out			9 : 5		15	
Loading-2	in	48069	4,000	9 : 14	9		Florida casino
	out			9 : 55		41	
Loading-3	in	48076	7,000	10 : 20	25		Westlands acad
	out			11 : 15		55	Naknatt
Loading-4	in	48077	1,000	11 : 25	10		Ukay (westlands)
	out			12 : 10		45	
				:			Note: Had a stop at
				:			kariobangi for a little
				:			unload by brokers
				:			from 12:45 to 1:05.
				:			Adometer reading is 48092.
				:			The truck had previous day
				:			refuse of about 2M3.
				:			
				:			The vehicle had a refuse of appro
				:			volume 2050cm3 of previous day.
				:			Otherwise todays exercise is for
				:			much better than the previous one.
				:			To dumping site through
Dumping site	in	48095.5	18,500	13 : 20	70		Thika rd and Outerring rd.
Start dumping		48096.6	1,100	13 : 30	10		
Finish dumping				14 : 40		70	
Dumping site	out	48097.6	1,000	14 : 54	14		
Reach to workshop	in	48110.5	12,900	15 : 15	21		
				:			
Total			53,500	:	189	226	Total min.: 415 min.
Collection			12,000	:	44	136	
Transportation			39,400	:	111		
Inside the dumping site			2,100	:	24	70	Dumping time
Idling time					10	20	for fueling

**Time & Motion Study**

Organization: BINS (NAIROBI) Trip-1 Date: 17/05/97

Vehicle No. KAE 341U

Loading Capacity: 6 TON

Researcher's name: L. KADERE

No. of Crew: 5

Estimated Volume: 5.7 TON

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	30327	0	8 : 19			
Loading-1	in	30330	3,000	8 : 35	16		Changamwe rd.-
	out		0	8 : 44		9	Car & General, Kamco Eng.
Loading-2	in	30330	0	8 : 45	1		Automotive Ltd.
	out			10 : 20		95	
Dumping site	in	30349.7	19,700	11 : 44	84		To dumping site via Osogo rd
Start dumping				:			30 min. break for lunch.
Finish dumping				:		0	
Dumping site	out	30350	300	12 : 45	61		
Reach to workshop	in	30365	15,000	13 : 20	35		
				:			
Total			38,000	:	197	104	Total min.: 301 min.
Collection			0	:	1	104	
Transportation			37,700	:	105		
Inside the dumping site			300	:	61	0	Dumping time
Idling time				:	30		lunch break

**Time & Motion Study**

Organization: BINS (NAIROB) Trip- 1 Date: 17/05/97

Vehicle No. KAE 761R

Loading Capacity: 2.690 TON Researcher's name: L. MUMBO

No. of Crew: 6

Estimated Volume:

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	22,710		8 : 24			Along Uhuru highway,
Loading-1	in	22,717	7,000	8 : 41	17		Riverside park.
	out			9 : 31		50	
Loading-2	in	22,724	7,000	9 : 50	19		Woodlands rd
	out			9 : 51		1	
Loading-3	in	22,724	200	9 : 56	5		
	out			9 : 57		1	
Loading-4	in		100	10 : 0	3		Jabavu rd
	out			10 : 2		2	
Loading-5	in	22,725	600	10 : 10	8		
	out			10 : 14		4	
Loading-6	in		300	10 : 17	3		Rose avenue
	out			10 : 19		2	
Loading-7	in		200	10 : 22	3		
	out			10 : 26		4	Argwing Kohdek rd
Loading-8	in		80	10 : 26	0		Argwing Kohdek close
	out			10 : 31		5	
Loading-9	in	22,726	600	10 : 35	4		
	out			10 : 38		3	Tigoni rd
Loading-10	in		800	10 : 43	5		
	out			10 : 46		3	
Loading-11	in		700	10 : 48	2		
	out			10 : 59		11	
Loading-12	in	22,728	600	11 : 5	6		
	out			11 : 6		1	
Loading-13	in	22,728	500	11 : 10	4		Ring Kilimani rd
	out			11 : 13		3	
Loading-14	in		200	11 : 19	6		Lenana rd
	out			11 : 24		5	
Loading-15	in		100	11 : 26	2		Lenana rd
	out			11 : 28		2	
Loading-16	in	22,729	200	11 : 29	1		Chaka rd
	out			11 : 35		6	
Loading-17	in		50	11 : 38	3		
	out			11 : 39		1	
Loading-18	in		250	11 : 44	5		
	out			11 : 48		4	
Loading-19	in		130	11 : 49	1		Kasuku rd
	out			11 : 51		2	
Loading-20	in		50	11 : 54	3		
	out			11 : 56		2	
Loading-21	in	22,730	500	11 : 58	2		
	out			12 : 3		5	
Loading-22	in		100	12 : 6	3		Lenana rd
	out			12 : 12		6	
Loading-23	in	22,742	11,900	12 : 39	27		
	out			12 : 52		13	

**Time & Motion Study**

Organization: BINS (NAIROB Trip- 1 Date: 17/05/97

Vehicle No. KAE 761R

Loading Capacity: 2.690 TON Researcher's name: L. MUMBO

No. of Crew: 6

Estimated Volume:

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Dumping site in	22,746	4,000	13 : 4	12		Dandora site
Start dumping			:			
Finish dumping			:		0	
Dumping site out	22,747	1,000	14 : 45	101		
Reach to workshop in	22,760	13,000	15 : 39	54		
			:			
Total		50,160	:	299	136	Total min.: 435 min.
Collection		25,160	:	115	136	
Transportation		24,000	:	83	0	
Inside the dumping site		1,000	:	101	0	Dumping time
Idling time			:			

**Time & Motion Study**

Organizati BINS(NRB)

Trip 1 Date:17/05/97

Vehicle No. KAE386R

Loading Capacity:6tons

Resacrher's Name: Esther Charo

No. of Crew: 4

Estimated Volume:7tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	35,325	0	8 : 7			From W/shop -Luasaka rd
Loading-1	in	35,329	4,000	8 : 19	12		to
	out			9 : 14		55	Petrol stn.
Loading-2	in	35,335	6,000	9 : 33	19		Likoni rd.-Jogoo rd.
	out			9 : 48		15	Serena Hotel
Loading-3	in	35,343	8,000	10 : 6	18		
	out			13 : 30		204	
Loading-4	in	35,345	2,000	13 : 48	18		Lunch break but no time lost
	out			14 : 0		12	
Dumping site	in	35,361	16,000	15 : 58	118		Dandora
Start dumping		35,361		16 : 5	7		
Finish dumping		35,361		16 : 57		52	to
Dumping site	out	35,361		17 : 0	3		
Reach to workshop	in	35,372	11,000	18 : 9	69		Workshop
				:			
<b>Total</b>			<b>47,000</b>	<b>:</b>	<b>264</b>	<b>338</b>	<b>Total min.:602min.</b>
Collection			16,000	:	55	286	
Transportation			31,000	:	199		
Inside the dumping site			0	:	10	52	Dumping time
Idling time				:			



**Time & Motion Study**

Organization: BINS

Trip- 1 Date: 17th May 1997

Vehicle No. KAE 441W

Loading Capacity: 6.5 tons

Researcher's name: Michael J. Gonda

No. of Crew: 5

Estimated Volume: 7 tons

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop		0	8 : 8			From the workshop the truck
Loading-1						took its way to Dandora dumping
						site through enterprice rd. then
						Landhies rd.-Ring rd. Ngara-
						Thika rd.-Outer ring rd. and got
						to the dumping site
Dumping site		15,000	9 : 0	52		
Start dumping		500	9 : 20	20		
Finish dumping		0	10 : 30		70	From dumping site went to
Dumping site		500	10 : 35	5		highrise for operation
Reach to workshop						
Total		16,000		77	70	Total min.: 147min.
Collection		0		0	0	
Transportation		15,000		52	0	
Inside the dumping site		1,000		25	70	Dumping time
Idling time						

**Time & Motion Study**

Organization: BINS

Trip- 2 Date: 17th May 1997

Vehicle No. KAE 441W

Loading Capacity: 6.5 tons

Researcher's name: Michael J. Gonda

No. of Crew: 5

Estimated Volume: 7 tons

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop out		0	10 : 35			From dandora dumping site the
Loading-1 in		30,000	11 : 13	38		truck went to Highrise for its
		0	12 : 48		95	day's Operation through
Loading-2 in		200	12 : 49	1		Matarakwa rd. to south
		0	12 : 59		10	Kariobangi and joined Outer ring
			:			rd.-Jogoo rd.-Lusaka rd. and got
						to Langata rd.
						Truck broke down for 8min
						Loading of garbage on to the
						track done manually by the use
						of forks and spades and so the
						exercise took so long
						From Highrise we went to
						dandora dumping through
						Mbagathi way-Ngong rd.-Haile
						selassie ave.-Park rd.-Muranga
						rd.-thika rd.-Outer ring rd.-
						Komarock rd. and into dumping
						site
			:			
Dumping site in		18,000	14 : 6	67		From dumping site, the truck
Start dumping		600	14 : 12	6		went to the workshop through
Finish dumping		0	14 : 36		24	Outer ring rd.-Jogoo rd.-Likoni
Dumping site out		600	14 : 42	6		rd. and to Kampala road to the
Reach to workshop in		15,000	15 : 16	34		Workshop
Total		64,400		152	129	Total min.:281min.
Collection		200		1	105	
Transportation		63,000		131	0	
Inside the dumping site		1,200		12	24	Dumping time
Idling time				8		

**Time & Motion Study**

Organization: BINS(NRB)

Trip-1 Date: 17/05/97

Vehicle No. KAE593R

Loading Capacity: 3 tons

Researcher's name: K.M.Mwakutema

No. of Crew: 4

Estimated Volume: 15 m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	60549		8 : 10			Kampala rd.-Lusaka rd.
Loading-1	in	60556	7,000	8 : 37	27		Lusaka rd.-Mama Ngina Str.
	out			9 : 23		46	20 min. tire checking
Loading-2	in	60556.9	900	9 : 28	5		Mama Ngina rd.-Loita rd.
	out			10 : 58		90	
Loading-3	in	60561	4,100	11 : 13	15		Loita rd.-Dar-ersalaam rd.
	out			11 : 22		9	
Loading-4	in	60565	4,000	11 : 35	13		Dar-esalaam rd.-Msa. rd.
	out			12 : 20		45	lunch break for 25 min.
				:			
				:			
Dumping site	in	60584	19,000	13 : 25	65		Dandora
Start dumping				:			
Finish dumping				:		0	
Dumping site	out	60585	1,000	14 : 15	50		
Reach to workshop	in	60598	13,000	14 : 45	30		
				:			
<b>Total</b>			<b>49,000</b>	<b>:</b>	<b>205</b>	<b>190</b>	<b>Total min.:395 min.</b>
Collection			<b>9,000</b>	<b>:</b>	<b>33</b>	<b>165</b>	
Transportation			<b>39,000</b>	<b>:</b>	<b>102</b>		
Inside the dumping site			<b>1,000</b>	<b>:</b>	<b>50</b>	<b>0</b>	<b>Dumping time</b>
Idling time				<b>:</b>	<b>20</b>	<b>25</b>	<b>tire checking / lunch break</b>

**Time & Motion Study**

Organization: BINS (NAIROB Trip- 1 Date: 17/05/97

Vehicle No. KSV 976

Loading Capacity: 2.5 TON Researcher's name: Ann J. Wangu

No. of Crew: 4

Estimated Volume: 7.875 M3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			10 : 0			
Loading-1	in			10 : 10	10		NIC
	out			10 : 35		25	
Loading-2	in			10 : 49	14		Lorrho house
	out			11 : 5		16	(Kaunda Street)
Loading-3	in			11 : 14	9		Rickshaw Chinese Rest
	out			11 : 30		16	(Fedha Towers)
Loading-4	in			11 : 35	5		Lukes Ltd.
	out			11 : 45		10	(Elite Arcade Bldg)
Loading-5	in			12 : 35	50		Norfolk Hotel
	out			12 : 42		7	(Harry Thuku rd.)
Loading-6	in			12 : 50	8		Steers (Tom Mboya Str.)
	out			13 : 0		10	
Loading-7	in			13 : 5	5		Steers (Jevanjee Gardns)
	out			13 : 45		40	
Loading-8	in			13 : 57	12		ABC Honours Rest.
	out			14 : 10		13	
				:			
				:			
Dumping site	in			15 : 50	100		Dandora
Start dumping				:			
Finish dumping				:		0	
Dumping site	out			16 : 20	30		
Reach to workshop	in			16 : 42	22		
				:			
Total				0 :	265	137	Total min.: 402 min.
Collection				0 :	103	137	
Transportation				0 :	132		
Inside the dumping site				0 :	30	0	Dumping time
Idling time				:			

**Time & Motion Study**

Organization:KENYA REFUS Trip- 1 Date:17/05/97

Vehicle No.KTM 206

Loading Capacity:1 TON

Researcher's name:F. MWATUA

No. of Crew:3

Estimated Volume:4 M3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			8 : 46			Kalyan building, Kimathi st.
Loading-1	in		750	8 : 49	3		Kaunda rd. - Corner hse
	out		0	9 : 2		13	
Loading-2	in		50	9 : 3	1		Kaunda rd. - Town hse
	out		0	9 : 8		5	
Loading-3	in		120	9 : 9	1		Mama Ngina st., Wabera st.
	out		0	9 : 12		3	Salang hse
Loading-4	in		8,000	9 : 22	10		Kenyatta ave. Uhuru highway
	out		0	9 : 25		3	Museum hill, Ngara rd.
Loading-5	in		8,500	9 : 36	11		Uhuru highway, Parliament
	out		0	9 : 43		7	Protection house.
Dumping site	in		20,000	10 : 20	37		Dumping at Embakasi quarry
Start dumping			5	10 : 21	1		through Uhuru highway
Finish dumping			0	10 : 32		11	Airport road. Vehicle washed
Dumping site	out		5	10 : 45	13		Same route followed back.
Reach to workshop	in		23,000	11 : 30	45		
				:			
Total			60,430	:	122	42	Total min.: 164 min.
Collection			16,670	:	23	31	
Transportation			43,750	:	85		
Inside the dumping site			10	:	14	11	Dumping time
Idling time				:			

**Time & Motion Study**

Organization: BINS (NAIROBI Trip-1) Date: 17/05/97

Vehicle No. KXF 820

Loading Capacity: 7 TON

Researcher's name: P. WANJIRU

No. of Crew: 5

Estimated Volume: 6 TON

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop out			8 : 15			Truck left for Dandora dumping site.
			:			
			:			
			:			Fuelling for 15 min.
			:			
			:			Through parkroad,
			:			Muranga rd, Thika rd,
			:			Outerring rd.
			:			
Dumping site in			10 : 11	116		Dandora site.
Start dumping			10 : 18	7		
Finish dumping			11 : 0		42	
Dumping site out			11 : 6	6		
Reach to workshop in			:			Workshop
			:			
Total		0	:	129	42	Total min.: 171 min.
Collection		0	:	0	0	
Transportation		0	:	101	0	
Inside the dumping site		0	:	13	42	Dumping time
Idling time			:	15		Fueling



**Time & Motion Study**

Organization: BINS (NAIROB) Trip-1 Date: 17/05/97

Vehicle No. KZV 006

Loading Capacity: 3 TON

Researcher's name: M. MWANGI

No. of Crew: 4

Estimated Volume: 2.5 TON

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop out	146575		11 : 57			To Dandora
Dumping site in	146587	12,000	12 : 30	33		Dandora
Start dumping			:			
Finish dumping			:		0	
Dumping site out	146590	3,000	13 : 13	43		
Reach to workshop in	146611	21,000	14 : 5	52		
			:			
Total		36,000	:	128	0	Total min.: 128 min.
Collection		0	:	0	0	
Transportation		33,000	:	85		
Inside the dumping site		3,000	:	43	0	Dumping time
Idling time			:			



**Time & Motion Study**

Organization: Bins

Trip 1 Date:19/05/97

Vehicle No. KAD 794Y

Loading Capacity: 5tons

Researcher's name: J. Kioko

No. of Crew: 5

Estimated Volume: 5.065m3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	48,158	0	7 : 50			Stop for 40 min at p/stn
Loading-1	in	48,175	17,400	9 : 5	75		Parklands
	out			9 : 10		5	
Loading-2	in	48,176	800	9 : 14	4		Parklands
	out			9 : 20		6	
Loading-3	in	48,176	300	9 : 25	5		Parklands
	out			9 : 26		1	
Loading-4	in		15	9 : 28	2		Parklands
	out			9 : 30		2	
Loading-5	in	48,178	2,000	9 : 32	2		Muthaiga Estate
	out			9 : 33		1	
Loading-6	in	48,178	200	9 : 34	1		Muthaiga Estate
	out			9 : 35		1	
Loading-7	in		15	9 : 36	1		Muthaiga Estate
	out			9 : 37		1	
Loading-8	in	48,179	800	9 : 39	2		Muthaiga S/Africa Embassy
	out			9 : 40		1	
Loading-9	in	48,181	2,000	9 : 45	5		Gigiri rd.
	out			9 : 48		3	
Loading-10	in	48,182	500	9 : 50	2		Collection along the rd.
	out			9 : 51		1	
Loading-11	in	48,181	10	9 : 52	1		
	out			9 : 53		1	
Loading-12	in	48,181	30	9 : 55	2		
	out			9 : 57		2	
Loading-13	in	48,181	5	9 : 58	1		Division of work to pick 2
	out			9 : 58		0	bags from each end Turkey
Loading-14	in	48,185	15	9 : 59	1		Embassy
	out			10 : 3		4	
Loading-15	in	48,186	100	10 : 5	2		slow drive
	out			10 : 6		1	
Loading-16	in	48,186	400	10 : 15	9		ICRAF
	out			10 : 25		10	
Loading-17	in	48,187	1,000	10 : 30	5		U.N(IPGRI)
	out			10 : 31		1	
Loading-18	in	48,187	100	10 : 32	1		
	out			10 : 33		1	UN Cresent
Loading-19	in		20	10 : 34	1		
	out			10 : 35		1	
Loading-20	in		30	10 : 36	1		
	out			10 : 37		1	
Loading-21	in		10	10 : 38	1		
	out			10 : 39		1	
Loading-22	in		5	10 : 40	1		
	out			10 : 41		1	
Loading-23	in		15	10 : 42	1		
	out			10 : 43		1	
Loading-24	in		15	10 : 44	1		
	out			10 : 46		2	

**Time & Motion Study**

Vehicle No. KAD 794Y  
No. of Crew: 5

Organization: Bins  
Loading Capacity: 5 tons  
Estimated Volume: 5.065m<sup>3</sup>

Trip 1 Date: 19/05/97  
Researcher's name: J. Kioko

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-25	in	48,187	100	10 : 49	3		
	out			10 : 50		1	
Loading-26	in		30	10 : 50	0		
	out			10 : 51		1	
Loading-27	in		60	10 : 52	1		
	out			10 : 53		1	
Loading-28	in	48,188	300	10 : 58	5		
	out			10 : 59		1	
Loading-29	in	48,189	1,500	11 : 0	1		Village Mkt.
	out			11 : 30		30	
Loading-30	in		10	11 : 31	1		
	out			11 : 32		1	
Loading-31	in		10	11 : 33	1		
	out			11 : 34		1	
Loading-32	in		5	11 : 35	1		
	out			11 : 36		1	
Loading-33	in		20	11 : 37	1		
	out			11 : 38		1	UN Crescent
Loading-34	in		15	11 : 39	1		
	out			11 : 39		0	
Loading-35	in		30	11 : 40	1		
	out			11 : 41		1	
Loading-36	in	48,189	200	11 : 42	1		
	out			11 : 43		1	
Loading-37	in	48,189	100	11 : 44	1		
	out			11 : 46		2	
Loading-38	in	48,190	300	11 : 49	3		
	out			12 : 41		52	China Garden
Loading-39	in	48,193	3,400	12 : 45	4		to D/site on the way stop
	out			12 : 55		10	of 45 min. puncture
Dumping site	in	48,208	15,000	13 : 15	20		
Start dumping		48,209	1,000	13 : 20	5		
Finish dumping				13 : 45		25	
Dumping site	out	48,210	1,000	13 : 50	5		
Reach to workshop	in			:			
Total			48,865		182	178	Total min.: 360 min.
Collection			14,465		117	108	
Transportation			32,400		55	0	
Inside the dumping site			2,000		10	25	Dumping time
Idling					40	45	stop on the way

**Time & Motion Study**

Organization: Bins

Trip 2 Date: 19/05/97

Vehicle No. KAD 794Y

Loading Capacity: 5tons

Researcher's name: J. Kioko

No. of Crew: 5

Estimated Volume: 6.3m3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	48,210		13 : 50			
Loading-1	in	48,219	9,000	14 : 0	10		Othelo line
	out			14 : 1		1	
Loading-2	in		150	14 : 4	3		
	out			14 : 4		0	
Loading-3	in	48,220	1,000	14 : 6	2		
	out			14 : 7		1	
Loading-4	in		500	14 : 8	1		
	out			14 : 10		2	Embassy of Kuwait
Loading-5	in		750	14 : 11	1		
	out			14 : 12		1	
Loading-6	in		450	14 : 13	1		
	out			14 : 14		1	
Loading-7	in	48,222	200	14 : 15	1		Clamson lane
	out			14 : 18		3	
Loading-8	in	48,223	50	14 : 20	2		Muthaiga crescent
	out			14 : 22		2	
Loading-9	in	48,223	40	14 : 25	3		
	out			14 : 28		3	
Loading-10	in	48,223	10	14 : 30	2		Sercion Lane
	out			14 : 31		1	
Loading-11	in	48,244	1000	14 : 34	3		Muthaiga close
	out			14 : 36		2	
Loading-12	in	48,225	500	14 : 38	2		
	out			14 : 40		2	
Loading-13	in		50	14 : 41	1		
	out			14 : 43		2	
Loading-14	in	48,225	495	14 : 44	1		Muthaiga rise
	out			14 : 46		2	
Loading-15	in	48,228	3000	14 : 50	4		China Gardens
	out			14 : 55		5	
Loading-16	in	48,228	100	14 : 56	1		UN crescent
	out			14 : 57		1	
Loading-17	in	48,229	500	14 : 58	1		Whispers Lane(UN)
	out			14 : 59		1	
Loading-18	in		100	15 : 0	1		
	out			15 : 0		0	
Loading-19	in		80	15 : 1	1		
	out			15 : 1		0	
Loading-20	in		150	15 : 1	0		
	out			15 : 2		1	
Loading-21	in	48,230	1,400	15 : 4	2		
	out			15 : 5		1	
Loading-22	in	48,231	700	15 : 7	2		Lobclia drive
	out			15 : 10		3	
Loading-23	in	48,231	300	15 : 13	3		
	out			15 : 15		2	
Loading-24	in	48,232	1,000	15 : 17	15		Garden rd.
	out			15 : 20		3	

**Time & Motion Study**

Organization: Bins  
 Vehicle No. KAD 794Y  
 No. of Crew: 5

Trip 2 Date: 19/05/97  
 Loading Capacity: Stons  
 Estimated Volume: 6.3m3

Researcher's name: J. Kioko

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-25	in	48,232	0	15 : 22	2		Daisy drive
	out			15 : 25		3	
Loading-26	in	48,232	0	15 : 27	2		
	out			15 : 30		3	
Loading-27	in	48,236	4000	15 : 35	5		
	out			15 : 37		2	
Loading-28	in	48,237	1000	15 : 40	3		
	out			15 : 41		1	
Loading-29	in	48,238	1000	15 : 43	2		Naivasha Avenue
	out			15 : 44		1	
Loading-30	in	48,239	1000	15 : 45	1		Tchui road(close)
	out			15 : 48		3	
Loading-31	in	48,240	1000	15 : 50	2		
	out			15 : 51		1	
Loading-32	in	48,241	1000	15 : 55	4		
	out			15 : 57		2	
Loading-33	in	48,242	500	15 : 58	1		
	out			15 : 59		1	
Loading-34	in	48,242	500	16 : 0	1		
	out			16 : 1		1	
Loading-35	in	48,243	500	16 : 2	1		
	out			16 : 3		1	
Loading-36	in		150	16 : 4	1		
	out			16 : 5		1	
Loading-37	in		50	16 : 7	2		
	out			16 : 9		2	
Dumping site	in	48,252	950	16 : 45	36		
Start dumping		48,253	1,000	16 : 50	5		
Finish dumping				17 : 15		25	
Dumping site	out	48,254	1,000	17 : 25	10		
Reach to workshop	in	48,269	1,500	18 : 0	35		
Total			36,675		176	87	Total min.:263 min.
Collection			23,225		80	62	
Transportation			11,450		81	0	
Inside the dumping site			2,000		15	25	Dumping time
Idling							

**Time & Motion Study**

Organization: Bins

Trip 1 Date:19/05/97

Vehicle No. KAE386R

Loading Capacity: 6tons

Researcher's Name: E.Charo

No. of Crew: 4

Estimated Volume: 8tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	35,372		8 : 12			W/shop to
Loading-1	in	35,382	10,000	9 : 43	91		Githurai estate to
	out			9 : 44		1	Thika rd.
Loading-2	in	35,394	12,000	9 : 59	15		
	out			10 : 0		1	Kasarani,Haco,Warren Ind.
Loading-3	in	35,400	6,000	10 : 11	11		
	out			10 : 13		2	
Loading-4	in	35,410	10,000	10 : 46	33		Kasarani beef
	out			10 : 53		7	
Loading-5	in	35,411	1,000	10 : 58	5		
	out			11 : 5		7	
Loading-6	in	35,415	4,000	11 : 13	8		
	out			11 : 16		3	
Loading-7	in	35,415	0	11 : 19	3		
	out			11 : 20		1	
Loading-8	in	35,416	1,000	11 : 22	2		
	out			11 : 23		4	
Loading-9	in	35,417	1,000	11 : 26	2		Garden Lane
	out			11 : 28		2	
Loading-10	in	35,417	0	11 : 30	1		
	out			11 : 31		3	
Loading-11	in	35,417	0	11 : 34	6		
	out			11 : 40		2	
Loading-12	in	35,417	0	11 : 42	1		
	out			11 : 43		2	
Loading-13	in	35,417	0	11 : 45	1		
	out			11 : 46		9	
Loading-14	in	35,420	3,000	11 : 55	3		
	out			11 : 58		2	
Loading-15	in	35,420	0	12 : 0	1		
	out			12 : 1		8	
Loading-16	in	35,422	2,000	12 : 9	1		
	out			12 : 10			
Loading-17	in	35,423	1,000	12 : 12	2		
	out			12 : 14		2	
Loading-18	in	35,423	0	12 : 17	3		
	out			12 : 19		2	
Loading-19	in	35,425	2,000	12 : 21	2		Kasarani - Nyumba ya wazee
	out			12 : 22		1	
Loading-20	in	35,426	1,000	12 : 23	1		
	out			12 : 26		3	
Loading-21	in	35,427	1,000	12 : 29	3		
	out			12 : 30		1	
Loading-22	in	35,428	1,000	12 : 34	4		
	out			12 : 34		0	
Loading-23	in	35,428	0	12 : 37	3		
	out			12 : 37		0	

# Time & Motion Study

Organization: Bins  
 Loading Capacity: 6tons  
 Estimated Volume: 8tons

Trip I Date: 19/05/97  
 Researcher's Name: E. Charo

Vehicle No. KAE386R  
 No. of Crew: 4

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-24	in	35,431	3,000	12 : 42	5		Kiambu
	out			12 : 43		1	
Loading-25	in	35,433	2,000	12 : 53	10		to
	out			12 : 54		1	
Loading-26	in	35,434	1,000	12 : 55	1		Njiru estate
	out			12 : 57		2	
Loading-27	in	35,434	0	12 : 58	1		
	out			12 : 58		0	
Loading-28	in	35,442	8,000	13 : 10	12		
	out			13 : 16		6	
Loading-29	in	35,442	0	13 : 24	8		
	out			13 : 26		2	
Loading-30	in	35,449	7,000	13 : 33	7		
	out			13 : 33		0	
Loading-31	in	35,449	0	13 : 34	1		
	out			13 : 35		1	
Loading-32	in	35,450	1,000	13 : 36	1		
	out			13 : 37		1	
Loading-33	in	35,450	0	13 : 38	1		Kiambu rd.
	out			13 : 39		1	
Loading-34	in	35,450	0	13 : 40	1		to
	out			13 : 41		1	
Loading-35	in	35,451	1,000	13 : 42	1		Limuru rd.
	out			13 : 44		2	
Loading-36	in	35,451	0	13 : 50	6		to
	out			13 : 58		8	
Loading-37	in	35,453	2,000	14 : 0	2		
	out			14 : 2		2	
Loading-38	in	35,454	1,000	14 : 7	5		
	out			14 : 8			1 Thika rd.
							to Thika rd. to
							Outer Ring rd. to
							Komarock rd. to
Dumping site	in	35,461	7,000	14 : 59	51		Dandora stie
Start dumping		35,461	0	15 : 2	3		
Finish dumping		35,461	0	16 : 32		90	
Dumping site	out	35,461	0	16 : 34	2		
Reach to workshop	in	35,474	13,000	17 : 43	69		
Total			102,000		389	182	Total min.: 571 min.
Collection			72,000		173	92	
Transportation			30,000		211	0	
Inside the dumping site			0		5	90	Dumping time
Idling							

**Time & Motion Study**

Organization: Bins

Trip 1 Date: 19/05/97

Vehicle No. KAE761R

Loading Capacity: 2690 kg

Researcher's name: L. Mumbo

No. of Crew: 6

Estimated Volume: 2700kg

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	22,760		7 : 51			Kampala rd.
	in	22,763	3,000	7 : 59	8		Fueling & Repair
	out			9 : 43		104	Lusaka rd
Loading-1	in	22,766	3,000	9 : 53	10		Enterprise rd.
	out			10 : 21		28	Repair
Loading-2	in	22,768	2,000	10 : 31	10		
	out			12 : 4		93	
Loading-3	in	22,771	3,000	12 : 13	9		
	out			12 : 16		3	Kitui rd.
Loading-4	in	22,772	1,000	12 : 21	5		
	out			12 : 27		6	
Loading-5	in	22,776	4,000	12 : 53	26		
	out			12 : 54		1	Bunyala rd.
Loading-6	in	22,777	1,000	13 : 0	6		
	out			13 : 28		28	
Loading-7	in	22,778	1,000	13 : 32	4		
	out			13 : 34		2	Shimo la Tewa rd.
Loading-8	in	22,778	500	13 : 38	4		
	out			14 : 24		46	
Loading-9	in	22,778	1,000	14 : 26	2		
	out			14 : 38		12	Kitui rd / Kalu Works
Loading-10	in	22,782	4,500	14 : 50	12		to
	out			16 : 48		118	
Dumping site	in			:	0		
Start dumping				:	0		
Finish dumping				:		0	
Dumping site	out			:	0		
Reach to workshop	in	22,788	6,000	16 : 56	8		
Total			29,100		104	441	Total min. : 545 min.
Collection			17,100		78	337	
Transportation			12,000		26		
Inside the dumping site			0		0	0	Dumping time
Idling						104	fuel/repair

**Time & Motion Study**

Organization: Bins

Trip- 1 Date: 19/05/97

Vehicle No. KEA441W

Loading Capacity: 6.5tons

Researcher's name: M. Gonda

No. of Crew: 5

Estimated Volume: 7tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out		0	8 : 5			to
Loading-1	in		30,000	8 : 52	47		Muthaiga estate
	out			8 : 53		1	
Loading-2	in		50	8 : 54	1		
	out			8 : 57		3	
Loading-3	in		100	8 : 58	1		
	out			9 : 0		2	
Loading-4	in		80	9 : 1	1		
	out			9 : 1		0	
Loading-5	in		50	9 : 2	1		first collection Thigiri
	out			9 : 2		0	ridge
Loading-6	in		150	9 : 4	2		
	out			9 : 5		1	
Loading-7	in		30	9 : 5	0		
	out			9 : 6		1	
Loading-8	in		50	9 : 6	0		
	out			9 : 7		1	
Loading-9	in		100	9 : 8	1		
	out			9 : 9		1	
Loading-10	in		50	9 : 9	0		
	out			9 : 10		1	Malbourgh estate
Loading-11	in		30	9 : 10	0		
	out			9 : 11		1	Red hill lane
Loading-12	in		80	9 : 11	0		
	out			9 : 12		1	
Loading-13	in		100	9 : 12	0		
	out			9 : 13		1	
Loading-14	in		200	9 : 15	2		
	out			9 : 16		1	
Loading-15	in		80	9 : 16	0		
	out			9 : 17		1	
Loading-16	in		50	9 : 17			
	out			9 : 18			
Loading-17	in		150	9 : 18			Thigiri close
	out			9 : 19		1	
Loading-18	in		200	9 : 21	2		Thigiri grove
	out			9 : 21		0	
Loading-19	in		80	9 : 23	2		
	out			9 : 24		1	
Loading-20	in		40	9 : 24	0		
	out			9 : 26		2	
Loading-21	in		30	9 : 26	0		
	out			9 : 27		1	
Loading-22	in		100	9 : 30	3		Track broke down for
	out			9 : 36		6	21 minutes
Loading-23	in		100	9 : 58	22		
	out			9 : 59		1	
Loading-24	in		80	9 : 59	33		
	out			10 : 0		1	



**Time & Motion Study**

Organization: Bins

Trip- 1 Date: 19/05/97

Vehicle No. KFA441W

Loading Capacity: 6.5tons

Researcher's name: M. Gonda

No. of Crew: 5

Estimated Volume: 7tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-25	in		150	10 : 2	2		
	out			10 : 5		3	
Loading-26	in		80	10 : 7	2		
	out			10 : 8		1	
Loading-27	in		90	10 : 9	1		
	out			10 : 10		1	
Loading-28	in		40	10 : 11	1		
	out			10 : 12		1	
Loading-29	in		110	10 : 12	0		
	out			10 : 13		1	
Loading-30	in		20	10 : 13	0		
	out			10 : 15		2	
Loading-31	in		100	10 : 16	1		
	out			10 : 18		2	
Loading-32	in		50	10 : 21	3		
	out			10 : 22		1	
Loading-33	in		50	10 : 23	1		
	out			10 : 24		1	
Loading-34	in		60	10 : 25	1		
	out			10 : 27		2	
Loading-35	in		50	10 : 27	0		
	out			10 : 28		1	Back to Redhill rd
Loading-36	in		100	10 : 30	2		
	out			10 : 34		4	
Loading-37	in		500	10 : 49	15		Red hill drive
	out			10 : 50		1	
Loading-38	in		200	10 : 51	1		
	out			10 : 52		1	
Loading-39	in		150	10 : 53	1		
	out			10 : 55		2	
Loading-40	in		200	10 : 57	2		
	out			10 : 59		2	
Loading-41	in		400	11 : 1	2		
	out			11 : 2		1	
Loading-42	in		200	11 : 3	1		
	out			11 : 4		1	
Loading-43	in		80	11 : 4	0		
	out			11 : 5		1	
Loading-44	in		150	11 : 6	1		
	out			11 : 6		0	
Loading-45	in		50	11 : 10	4		
	out			11 : 14		4	
Loading-46	in		40	11 : 16	2		
	out			11 : 20		4	Lunch break for 24 min.
Loading-47	in		100	11 : 28	8		
	out			11 : 28		0	
Loading-48	in		80	11 : 30	24		
	out			11 : 32		2	

**Time & Motion Study**

Organization: Bins  
 Vehicle No. KEA441W  
 No. of Crew: 5

Trip- 1 Date: 19/05/97  
 Loading Capacity: 6.5tons  
 Estimated Volume: 7tons

Researcher's name: M. Gonda

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-49		100	11 : 32	0		
			11 : 34		2	Efficiency of collection
Loading-50		200	11 : 38	4		is hindered by clients
			11 : 40		2	not dispose gabagge bags
Loading-51		50	11 : 44	4		in time
			11 : 45		1	
Loading-52		120	11 : 49	4		
			11 : 50		1	
Loading-53		40	11 : 52	2		
			11 : 52		0	
Loading-54		50	11 : 56	4		
			11 : 59		3	
Loading-55		100	12 : 2	3		
			12 : 6		4	
Loading-56		100	12 : 9	6		
			12 : 12		4	
Loading-57		50	12 : 16	3		
			12 : 19		0	
Loading-58		150	12 : 19	3		
			12 : 22		2	
Loading-59		200	12 : 24	1		
			12 : 25		1	
Loading-60		120	12 : 26	2		
			12 : 28		8	
Loading-61		50	12 : 36	3		
			12 : 39		7	
Loading-62		80	12 : 46	1		
			12 : 47		2	
Loading-63		100	12 : 49	13		
			13 : 2		4	
Loading-64		50	13 : 6	2		
			13 : 8			
Loading-65		40	13 : 9	1		Trio estate
			13 : 12		3	
Loading-66		100	13 : 14	2		Rosylyn estate
			13 : 14		0	
Loading-67		200	13 : 22	8		
			13 : 26		4	Guongo estate
Loading-68		100	13 : 28	2		Guongo drive
			13 : 29		1	
Loading-69		80	13 : 32	3		
			13 : 34		2	
Loading-70		50	13 : 36	2		Runda etstate
			13 : 40		4	
Loading-71		30	13 : 42	16		off Mimosa road
			13 : 46		4	
Loading-72			13 : 48	2		Mimosa road
			13 : 55		7	

**Time & Motion Study**

Organization: Bins

Trip-1 Date: 19/05/97

Vehicle No. KEA441W

Loading Capacity: 6.5tons

Researcher's name: M. Gonda

No. of Crew: 5

Estimated Volume: 7tons

Location	Mileage (m)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-73	in		13 : 57	2		Runda drive
	out		13 : 59		2	Kiambu rd. into Thika rd.
Loading-74	in	120	14 : 2	3		to Outer ring road to
	out		14 : 6		4	K/rock rd. to D/site
Dumping site	in	18,000	15 : 12	58		
Start dumping		400	15 : 20	8		
Finish dumping			15 : 49		29	
Dumping site	out	40	15 : 52	3		
Reach to workshop	in	15,000	17 : 9	77		
Total		70,750		435	169	Total min.:604 min.
Collection		7,310		221	140	
Transportation		63,000		182	0	
Inside the dumping site		440		11	29	Dumping time
Idling				21		track broke down/lunch break

### Time & Motion Study

Organization: BINS

Trip 1 Date: 19/05/97

Vehicle No. KEA593R

Loading Capacity: 3 tons

Researcher's name: K. Mwakutema

No. of Crew: 4

Estimated Volume: 3.5 tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	60,616		7 : 31			Kampala rd. to
Loading-1	in	60,625	9,000	7 : 55	24		Muthaiga
	out			8 : 32		37	
Loading-2	in	60,626	1,000	8 : 37	5		Muthaiga
	out			8 : 45		8	
Loading-3	in	60,627	1,000	8 : 49	4		Muthaiga
	out			9 : 11		22	
Loading-4	in	60,629	2,000	9 : 14	3		Muthaiga
	out			9 : 20		6	
Loading-5	in	60,634	5,000	9 : 28	8		Muthaiga into Thika rd.
	out			9 : 32		4	
Loading-6	in		25	9 : 34	2		Thika rd.
	out			9 : 39		5	22 min. tea break
Loading-7	in		20	9 : 40	1		Thika rd.
	out			9 : 48		8	
Loading-8	in		20	9 : 49	1		Thika rd.
	out			9 : 52		3	
Loading-9	in		15	9 : 53	1		Thika rd.
	out			10 : 11		18	
Loading-10	in	60,636	1,920	10 : 16	5		Thika rd to Utalii Hotel
	out			10 : 18		2	
Loading-11	in	60,637	1,000	10 : 22	4		Utalii Hotel
	out			10 : 25		3	
Loading-12	in		900	10 : 30	5		Utalii Hotel
	out			10 : 46		16	
Loading-13	in	60,639	1,100	10 : 54	8		Utalii Hotel to Thika rd.
	out			10 : 55		1	Hotel
Dumping site	in	60,646	7,000	11 : 33	38		
Start dumping				:			
Finish dumping				:		0	
Dumping site	out	60,647	1,000	12 : 35	62		
Reach to workshop	in			:			
Total			31,000		171	133	Total min.: 304 min.
Collection			14,000		47	133	
Transportation			16,000		40		
Inside the dumping site			1,000		62	0	Dumping time
Idling					22		tea break

**Time & Motion Study**

Organization: Bins

Trip 2 Date: 19/05/97

Vehicle No. KEA 593 R

Loading Capacity: 3tons

Researcher's name: K. Mwakutema

No. of Crew: 4

Estimated Volume: 2tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	60,647		12 : 35			Dumping site to Thika rd.
Loading-1	in	60,654	7,000	14 : 5	90		Thika rd.
	out			14 : 21		16	30 min. lunch break
Loading-2	in			14 : 25	4		Thika rd.
	out			15 : 35		70	
							Thika rd. to Dumping site
							65 min. tyre repair
Dumping site	in	60,663	9,000	16 : 35	60		
Start dumping				:			
Finish dumping				:		0	
Dumping site	out	60,664	1,000	17 : 0	25		
Reach to workshop	in	60,680	16,000	17 : 40	40		
Total			33,000		219	86	Total min.: 305 min.
Collection			0		4	86	
Transportation			32,000		95		
Inside the dumping site			1,000		25	0	Dumping time
Idling					95		Lunch break/Tire repair

**Time & Motion Study**

Organizati BINS(NRBI)

Trip-1 Date:19/05/97

Vehicle No. KQY636

Loading Capacity: 12tons

Researcher's name: J. Atieno

No. of Crew: 6

Estimated Volume: 9tnos

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			7 : 55			Bins (nrbi depot)
Loading-1	in			8 : 10	15		Langata rd-Mbagathi rd-
	out			12 : 30		260	Nyayo hse estate
Loading-2	in			:			Mbangathi rd-Langata rd.
	out			:		0	to the Estate
Loading-3	in			:	0		Jogoo rd-Rabai rd-
	out			:		0	via Buru-Buru Estate
Dumping site	in			13 : 25	55		Dandora D/site
Start dumping				:			
Finish dumping				:		0	
Dumping site	out			14 : 35	70		
Reach to workshop	in			16 : 30	115		
Total			0		255	260	Total min.:515 min.
Collection			0		0	260	
Transportation			0		185		
Inside the dumping site			0		70	0	Dumping time
Idling							

**Time & Motion Study**

Organization: Bins

Trip 1 Date: 19/05/97

Vehicle No. KST976

Loading Capacity: 2.5 tons

Researcher's name: A. Wangu

No. of Crew: 4

Estimated Volume: 7.875m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			7 : 30			W/shop
Loading-1	in			8 : 15	45		to Meuseum hill centre
	out			9 : 30		75	to
Loading-2	in			9 : 55	25		Norfolk hotel
	out			10 : 0		5	Tubman rd.
Loading-3	in			10 : 11	11		
	out			10 : 13		2	Lukes ltd.
Loading-4	in			10 : 18	5		
	out			10 : 23		5	Rickshaw Chinese rest (Kaunda str)
Loading-5	in			10 : 43	20		
	out			10 : 45		2	Clinical Laboratory
Loading-6	in			10 : 54	9		
	out			11 : 0		6	City Nursing home
Loading-7	in			11 : 11	11		
	out			11 : 16		5	Steers( on Tom Mboya str)
Loading-8	in			11 : 35	19		
	out			:			Muranga rd-Thika rd.- Outer Ring rd.-Koma Rock rd-D/site
Dumping site	in			12 : 16	41		Dandora
Start dumping				:			
Finish dumping				:		0	
Dumping site	out			12 : 31	15		
Reach to workshop	in			:			
Total			0		201	100	Total min.:301 min.
Collection			0		100	100	
Transportation			0		86		
Inside the dumping site			0		15	0	Dumping time
Idling							

### Time & Motion Study

Organization: Bins

Trip 2 Date: 19/05/97

Vehicle No. KST976

Loading Capacity: 2.5 tons

Researcher's name: A. Wangu

No. of Crew: 4

Estimated Volume: 7.875m<sup>3</sup>

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			12 : 31			Dandora site
Loading-1	in			13 : 5	34		Vic Preston Ltd. (Uni. Way)
	out			13 : 23		18	Shell BP
Loading-2	in			13 : 25	2		Evangelical J. State hse rd
	out			13 : 30		5	
Loading-3	in			13 : 34	4		Avenue Kibanda House
	out			13 : 41		7	
Loading-4	in			13 : 42	1		Queens D/Cleaner (K/Av)
	out			13 : 47		5	
Loading-5	in			13 : 48	1		Chester hse(Koinange Str)
	out			14 : 50		62	
Loading-6	in			15 : 0	10		Norfolk Towers (Station 1)
	out			15 : 40		40	
Loading-7	in			15 : 43	3		Steers(opp Jevanjee gs)
	out			16 : 40		57	
							Moi Av-Muranga rd-
							Thika rd.-O/Ring rd.-
							Koma Rock rd-
Dumping site	in			17 : 30	50		D/site
Start dumping				:			
Finish dumping				:		0	
Dumping site	out			18 : 0	30		
Reach to workshop	in			18 : 30	30		
Total			0		165	194	Total min.: 359 min.
Collection			0		21	194	
Transportation			0		114		
Inside the dumping site			0		30	0	Dumping time
Idling							



**Time & Motion Study**

Organization: Bins

Trip 1 Date: 19/05/97

Vehicle No. KXF820

Loading Capacity: 7tons

Researcher's name: P. Wajiru

No. of Crew: 5

Estimated Volume:

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out			7 : 50			Throu' Kampala rd.
Loading-1	in			8 : 15	25		
	out			11 : 23		188	to
Loading-2	in			11 : 50	27		Enterprise rd.
	out			11 : 57		7	to Bunyala rd.
Loading-3	in			12 : 3	6		to Upper hill
	out			12 : 20		17	to Panafrica and back to
Loading-4	in			12 : 25	5		Bunyala rd. to Patro Station
	out			14 : 11		106	to Enterprise rd.
Loading-5	in			14 : 30	19		to Ngara rd.
	out			14 : 46		16	to Stima Plaza
Loading-6	in			:			
	out			:		0	to Dandora
Loading-7	in			:	0		
	out			:		0	then back to W/shop
Dumping site	in			16 : 39	113		
Start dumping				16 : 43	4		
Finish dumping				18 : 50		127	
Dumping site	out			18 : 54	4		
Reach to workshop	in			19 : 5	11		
Total			0		214	461	Total min.: 675 min.
Collection			0		57	334	
Transportation			0		149		
Inside the dumping site			0		8	127	Dumping time
Idling							

**Time & Motion Study**

Organization: BINS

Trip-1 Date: 19/05/97

Vehicle No. KZV006

Loading Capacity: 3ton

Researcher's name: M.Mwangi

No. of Crew: 4

Estimated Volume: 3.7 tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	146,612		8 : 10			Bins to Westlands
Loading-1	in	146,625	13,000	8 : 46	36		Sebastian Court
	out			9 : 2		16	
Loading-2	in	146,630	5,000	9 : 11	9		Thomas Barnados
	out			9 : 14		3	H.P Court
Loading-3	in	146,632	2,000	9 : 22	8		Hill Park
	out			9 : 25		3	
Loading-4	in	146,633	1,000	9 : 27	2		Fairview Hotel
	out			9 : 46		19	
Loading-5	in	146,636	3,000	9 : 55	9		
	out			10 : 8		13	
Loading-6	in	146,637	1,000	10 : 15	7		Israel Embassy
	out			10 : 33		18	
Loading-7	in	146,640	3,000	10 : 46	13		Chaahat Restaurant
	out			11 : 10		24	
Loading-8	in	146,641	1,000	11 : 18	8		Car & General
	out			12 : 0		42	
Loading-9	in	146,641	0	12 : 5	5		Rank xerox
	out			12 : 25		20	
Loading-10	in	146,642	1,000	12 : 26	1		Pamsteech House
	out			12 : 30		4	
Loading-11	in	146,642	0	12 : 44	14		Apex Centre
	out			12 : 54		10	Igwaro Rest.
Loading-12	in	146,643	1,000	13 : 0	6		
	out			13 : 8		8	
Loading-13	in	146,643	0	13 : 10	2		Shimmer Plaza
	out			13 : 15		5	
Loading-14	in			14 : 17	62		20 min. break for lunch
	out			:			
Dumping site	in	146,650	7,000	14 : 37	20		Dandora D/site
Start dumping				14 : 40	3		
Finish dumping				15 : 26		46	
Dumping site	out			15 : 41	15		
Reach to workshop	in	146,660	10,000	:			
Total			48,000		220	231	Total min.: 451 min.
Collection			18,000		126	185	
Transportation			30,000		56		
Inside the dumping site			0		18	46	Dumping time
Idling					20		lunch break

**Time & Motion Study**

Organization: BINS

Trip-2 Date: 19/05/97

Vehicle No. KZV006

Loading Capacity: 3tons

Researcher's name: M. Mwangi

No. of Crew: 4

Estimated Volume: 3.5tons

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from dumping site	out	146,660		15 : 41			Dandora to Ngara estate
Loading-1	in	146,669	9,000	16 : 12	31		Durga Restuarant
	out			16 : 15		3	
Loading-2	in	146,671	2,000	16 : 21	6		Ruby Printers
	out			16 : 24		3	
Loading-3	in	146,672	1,000	16 : 29	5		MCL house
	out			16 : 35		6	
Loading-4	in	146,674	2,000	16 : 48	13		conservation co.
	out			16 : 52		4	
Loading-5	in	146,675	1,000	16 : 55	3		Maunya rest.
	out			16 : 56		1	
Loading-6	in	146,676	1,000	17 : 2	6		Karuna close
	out			17 : 3		1	
Loading-7	in	146,678	2,000	17 : 8	5		Chiromo Court
	out			17 : 12		4	
Loading-8	in	146,679	1,000	17 : 20	8		Palm court
	out			17 : 21		1	
Loading-9	in	146,680	1,000	17 : 28	7		Kalamu house
	out			17 : 32		4	
Loading-10	in	146,683	3,000	17 : 38	6		Ornas
	out			17 : 46		8	
Dumping site	in			:			
Start dumping				:	0		
Finish dumping				:		0	
Dumping site	out			:	0		
Reach to workshop	in	146,695	12,000	18 : 26	40		
				:			
Total			35,000	:	130	35	Total min.: 165 min.
Collection			14,000	:	59	35	
Transportation			21,000	:	71		
Inside the dumping site			0	:	0	0	Dumping time
Idling				:			

**Time & Motion Study**

Organization: Bins

Trip 1 Date:19/5/97

Vehicle No. KAE341U

Loading Capacity: 6tons

Researcher's name: L. Kadere

No. of Crew: 5

Estimated Volume:

Location	Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out		0 14 : 42			
Loading-1	in		:			Vehicle broke down so
	out		:		0	did not operate
Dumping site	in		:	0		
Start dumping			:	0		
Finish dumping			:		0	
Dumping site	out		:	0		
Reach to workshop	in	12,000	15 : 40	58		
Total		12,000		58	0	Total min.: min.
Collection		0		0	0	
Transportation		12,000		58		
Inside the dumping site		0		0	0	Dumping time
Idling						

**Time & Motion Study**

Organization: BINS

Trip 1 Date:20/5/97

Vehicle No. KAD794Y

Loading Capacity: 5TONS

Researcher's name: J. Kioko

No. of Crew: 5

Estimated Volume: 6.55M3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	48,269		7 : 50			30 min. at p/stn(idling)
Loading-1	in	48,279	10,000	9 : 28	98		Kiambere rd.
	out			9 : 35		7	
Loading-2	in	48,280	600	9 : 36	1		
	out			9 : 40		4	
Loading-3	in	48,280	400	9 : 45	5		U/hill camp site
	out			9 : 50		5	
Loading-4	in	48,281	1,000	9 : 55	5		coconut rest.
	out			10 : 5		10	
Loading-5	in		50	10 : 5	0		Kasneb towers
	out			10 : 10		5	
Loading-6	in	48,287	5,950	10 : 25	15		Gen.Conference of SDA
	out			10 : 27		2	Riverside drive
Loading-7	in		70	10 : 28	1		Prepress prod.
	out			10 : 32		4	
Loading-8	in	48,288	930	10 : 34	2		L. D. Memorial home
	out			10 : 35		1	
Loading-9	in	48,289	1,000	10 : 37	2		R/Side Properties ltd.
	out			10 : 40		3	
Loading-10	in		85	10 : 42	2		Aborteum
	out			10 : 47		5	view
Loading-11	in	48,290	415	10 : 49	2		Ring rd. r/side
	out			10 : 51		2	
Loading-12	in		100	10 : 54	3		
	out			10 : 55		1	
Loading-13	in	48,290	400	10 : 56	1		
	out			10 : 57		1	
Loading-14	in		50	10 : 58	1		Cornelison M.
	out			11 : 0		2	
Loading-15	in	48,291	450	11 : 1	1		
	out			11 : 2		1	
Loading-16	in	48,291	500	11 : 3	1		Nathoo
	out			11 : 4		1	
Loading-17	in	48,292	500	11 : 5	1		R/side drive
	out			11 : 6		1	Kirichwa Grove Flats
Loading-18	in		100	11 : 6	0		
	out			11 : 9		3	
Loading-19	in		100	11 : 13	4		
	out			11 : 14		1	
Loading-20	in	48,292	300	11 : 15	1		Zarnash
	out			11 : 16		1	
Loading-21	in	48,292	100	11 : 17	1		R/side lane
	out			11 : 18		1	
Loading-22	in	48,293	400	11 : 20	2		
	out			11 : 22		2	
Loading-23	in	48,293	300	11 : 24	2		M. Steuens
	out			11 : 26		2	
Loading-24	in	48,293	200	11 : 30	14		Beglin woods
	out			11 : 31		1	

**Time & Motion Study**

Organization: BINS

Trip 1 Date: 20/5/97

Vehicle No. KAD794Y

Loading Capacity: 5TONS

Researcher's name: J. Kioko

No. of Crew: 5

Estimated Volume: 6.55M3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-25	in		120	11 : 32	1		Spineleer Henn
	out			11 : 34		2	
Loading-26	in		80	11 : 35	1		Patel B1
	out			11 : 36		1	
Loading-27	in	48,294	800	11 : 38	2		R/side drive manage
	out			11 : 42		4	
Loading-28	in	48,295	500	11 : 43	1		
	out			11 : 45		2	
Loading-29	in	48,295	100	11 : 48	3		
	out			11 : 51		3	
Loading-30	in	48,295	300	11 : 55	4		R/side drive
	out			12 : 0		5	
Loading-31	in	48,295	100	12 : 1	1		
	out			12 : 2		1	
Loading-32	in		20	12 : 2	0		
	out			12 : 3		1	
Loading-33	in	48,296	680	12 : 5	2		R/side gardens
	out			12 : 6		1	
Loading-34	in	48,296	300	12 : 9	3		R/side west
	out			12 : 10		1	
Loading-35	in	48,296	100	12 : 11	1		Lonhro Africa
	out			12 : 12		1	
Loading-36	in		70	12 : 13	1		
	out			12 : 14		1	
Loading-37	in	48,297	330	12 : 15	1		Embassy of Japan
	out			12 : 16		1	
Loading-38	in	48,297	400	12 : 18	2		
	out			12 : 19		1	
Loading-39	in	48,297	100	12 : 20	1		
	out			12 : 21		1	
Loading-40	in	48,298	500	12 : 22	1		Church hall
	out			12 : 23		1	
Loading-41	in		30	12 : 24	1		Patel
	out			12 : 25		1	
Loading-42	in		100	12 : 26	1		R/side villas
	out			12 : 27		1	
Loading-43	in	48,298	70	12 : 30	3		
	out			12 : 40		10	
Loading-44	in	48,298	30	12 : 44	4		R/side drive
	out			12 : 45		1	
Loading-45	in	48,298	100	12 : 46	1		
	out			12 : 47		1	
Loading-46	in	48,298	100	12 : 48	1		
	out			12 : 49		1	
Loading-47	in	48,299	500	12 : 50	1		
	out			12 : 52		2	
Loading-48	in	48,299	50	12 : 52	7		
	out			12 : 53		1	

**Time & Motion Study**

Organization: BINS

Trip 1 Date: 20/5/97

Vehicle No. KAD794Y

Loading Capacity: 5 TONS

Researcher's name: J. Kioko

No. of Crew: 5

Estimated Volume: 6.55M3

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-49	in		50	12 : 55	2		R/side drive west
	out			12 : 56		5	
Loading-50	in	48,299	200	13 : 0	2		
	out			13 : 2		1	
Loading-51	in	48,299	200	13 : 3	1		
	out			13 : 4		0	
Loading-52	in		25	13 : 4	1		
	out			13 : 5		1	
Loading-53	in		75	13 : 6	1		
	out			13 : 7		2	
Loading-54	in	48,300	600	13 : 9	2		
	out			13 : 11		1	
Loading-55	in	48,300	100	13 : 12	2		
	out			13 : 14		1	
Loading-56	in	48,300	200	13 : 15	1		
	out			13 : 16		2	
Loading-57	in		30	13 : 18	2		
	out			13 : 20			
Dumping site	in	48,324	23,300	14 : 40	80		
Start dumping		48,324	500	14 : 50	10		
Finish dumping				15 : 45		55	
Dumping site	out	48,325	500	15 : 55	10		
Reach to workshop	in	48,339	14,500	16 : 20	25		
Total			69,760		348	179	Total min.: 527 min.
Collection			20,960		155	124	
Transportation			47,800		173	0	
Inside the dumping site			1,000		20	55	Dumping time
Idling					30		for fueling

**Time & Motion Study**

Organization: BINS

Trip 1 Date: 20/5/97

Vehicle No. KAE34IU

Loading Capacity: 6TONS

Researcher's name: L. Kadere

No. of Crew: 5

Estimated Volume: 5.5TONS

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Start from workshop	out	30,396		8 : 37			10 min. fueling on
Loading-1	in	30,398	2,000	9 : 12	35		Kampala rd. Lusaka rd.
	out			9 : 24		12	Back to w/shop to drop some
Loading-2	in	30,410	12,000	10 : 22	58		bins Msangari rd.
	out			10 : 23		1	W/lands
Loading-3	in	30,410	0	10 : 24	1		Waiyaki way
	out			10 : 29		5	
Loading-4	in	30,412	2,000	10 : 32	3		Cross apple rd
	out			10 : 33		1	
Loading-5	in	30,412	0	10 : 34	1		Apples cross rd.
	out			10 : 35		1	
Loading-6	in	30,412	0	10 : 36	1		
	out			10 : 37		1	
Loading-7	in	30,413	1,000	10 : 37	0		
	out			10 : 38		1	
Loading-8	in	30,413	0	10 : 42	4		Muhoya avenue
	out			10 : 43		1	
Loading-9	in	30,413	0	10 : 45	2		
	out			10 : 45		0	
Loading-10	in	30,413	0	10 : 46	1		
	out			10 : 47		1	
Loading-11	in	30,413	0	10 : 48	1		Maji mazuri rd.
	out			10 : 49		1	
Loading-12	in	30,413	0	10 : 49	0		
	out			10 : 50		1	
Loading-13	in	30,413	0	10 : 51	1		
	out			10 : 53		2	
Loading-14	in	30,413	0	10 : 54	1		Apples cross rd.
	out			10 : 54		0	
Loading-15	in	30,413	0	10 : 56	2		
	out			10 : 57		1	
Loading-16	in	30,415	2000	11 : 0	3		Isaac Gathianju rd.
	out			11 : 3		3	
Loading-17	in	30,415	0	11 : 7	4		El-Molo drive
	out			11 : 9		2	
Loading-18	in	30,415	0	11 : 10	1		
	out			11 : 11		1	
Loading-19	in	30,415	0	11 : 12	1		
	out			11 : 12		0	
Loading-20	in	30,417	2,000	11 : 15	3		Isaac Gathianju rd.
	out			11 : 15		0	
Loading-21	in	30,417	0	11 : 17	2		
	out			11 : 17		0	
Loading-22	in	30,417	0	11 : 18	1		Isaac Gathianju rd.
	out			11 : 19		1	
Loading-23	in	30417	0	11 : 20	1		
	out			11 : 20		0	
Loading-24	in	30,417	0	11 : 22	7		O'washika rd.
	out			11 : 23		1	



**Time & Motion Study**

Organization: BINS

Trip 1 Date: 20/5/97

Vehicle No. KAE341U

Loading Capacity: 6TONS

Researcher's name: L. Kadere

No. of Crew: 5

Estimated Volume: 5.5TONS

Location		Mileage (km)	Distance (m)	Time	Moving time (min.)	Loading time (min.)	Remarks (route)
Loading-25	in	30,418	1,000	11 : 24	1		
	out			11 : 25			1
Loading-26	in		250	11 : 26	1		
	out			11 : 26			0
Loading-27	in		650	11 : 27	1		Convent drive
	out			11 : 28			
Loading-28	in		140	11 : 29	1		
	out			11 : 30			1
Loading-29	in		100	11 : 31	1		
	out			11 : 31			0
Loading-30	in		450	11 : 33	2		
	out			11 : 34			1
Loading-31	in		250	11 : 34	0		
	out			11 : 35			1
Loading-32	in		650	11 : 38	3		Chalbi drive
	out			11 : 39			
Loading-33	in	30,420	500	11 : 41	2		Chalbi drive
	out			11 : 42			
Loading-34	in		250	11 : 43	1		
	out			11 : 47			4
Loading-35	in		150	11 : 48	1		
	out			11 : 49			1
Loading-36	in		142	11 : 50	1		
	out			11 : 51			1
Loading-37	in		120	11 : 52	1		
	out			11 : 53			1
Loading-38	in		310	11 : 54	1		
	out			11 : 56			2
Loading-39	in		263	11 : 57	1		Njumbi rd.
	out			11 : 58			
Loading-40	in		125	11 : 59	1		Njumbi rd.
	out			12 : 0			
Loading-41	in		350	12 : 0	0		Njumbi lane
	out			12 : 2			
Loading-42	in		354	12 : 3	1		Njumbi rd.
	out			12 : 4			
Loading-43	in		200	12 : 5	1		Njumbi rd.
	out			12 : 6			
Loading-44	in		650	12 : 10	4		Loiyangalani rd
	out			12 : 11			
Loading-45	in		120	12 : 12	1		Loiyangalani rd
	out			12 : 12			
Loading-46	in		100	12 : 13	1		Loiyangalani rd
	out			12 : 13			
Loading-47	in		150	12 : 14	1		Loiyangalani rd
	out			12 : 15			
Loading-48	in		200	12 : 16	5		Convent drive
	out			12 : 16			